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CHICKS

HATCHING & REARING

WEBB PUBLISHING CO.
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CHICKS

HATCHING AND REARING

A Manual of Dependable Instruction in Incubating, Brooding, Feeding, Housing and Developing Winners and Layers; Fattening, Killing and Marketing Broilers and Roasting Chickens

BY H. A. NOURSE
and Nineteen Other Successful Poultrymen.

COMPLETELY ILLUSTRATED

Price Twenty-five Cents

WEBB PUBLISHING COMPANY
ST. PAUL, MINNESOTA

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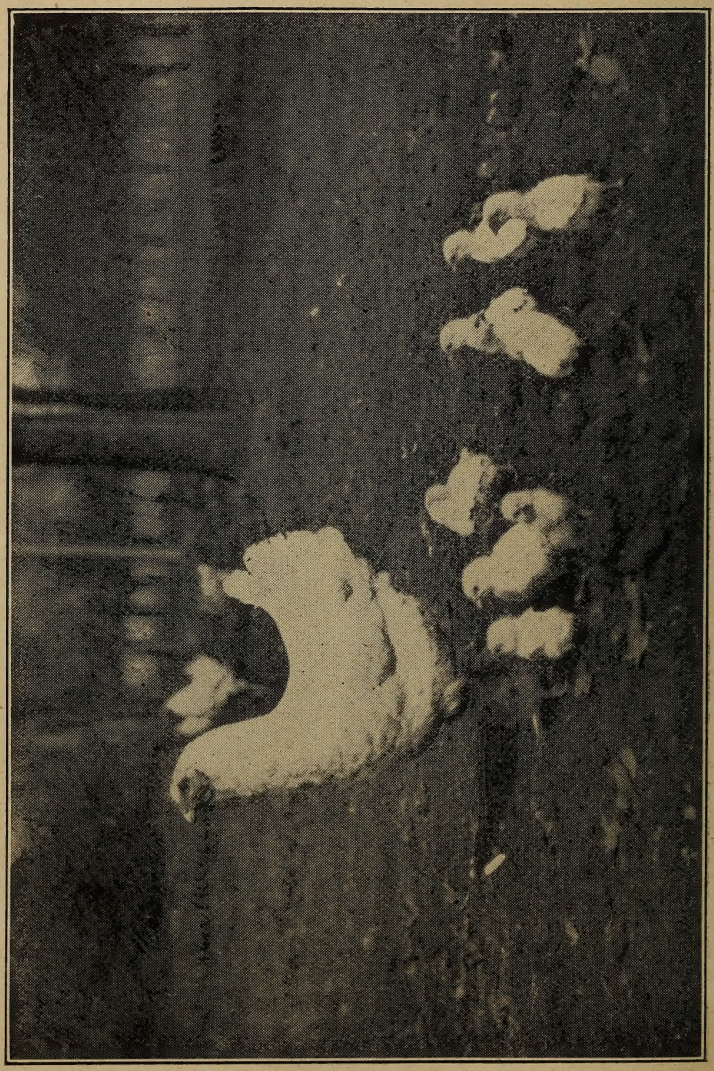

CHICKS

INTRODUCTION

Success in hatching and rearing the chicks is absolutely necessary for profitable poultry keeping. The fancier, the egg farmer and the market poulterer must produce every year a certain greater or less number of chickens. The fancier must have cockerels and pullets for exhibition and sale, the egg man must have pullets to lay, the poulterer must have tender broilers and roasters for his trade and all must replace the stock sold, or aged beyond its usefulness.

This young stock is required to be good or it will not satisfactorily and profitably serve its various purposes; the mere fact that it has been brought from the shell and made to live until it is time to market it, or to maturity, as the case may be, is no guaranty that it will sooner or later return a fair rate of interest on its cost. Thousands of chicks are hatched each year and placed in brooders, which, either because of weakness in the parent stock or improper incubation, are practically worthless, so far as their ability to make good growth and development is concerned. Other thousands which leave the shell strong and healthy are spoiled in the rearing, so that they reach the profit-turning age in such condition that they are unfit for the purposes of their owners.

The only chick that is profitable is the one well hatched and well reared, so that it possesses health and vigor. This indicates the necessity of proper incubation, healthful brooding, correct feeding and intelligent care. It seems

to be the opinion of those who have the best right to know that not more than twenty-five per cent of the chicks that leave the shell each year receive proper treatment. Sometimes this is due to shiftlessness of their owners, but more often is the result of a lack of knowledge of how to do the work. Apparently the need of more and better knowledge of the business of rearing the chicks is imperative, and it is the purpose of this book to furnish the required information on all phases of this branch of the poultry industry, in convenient form, in language which is easily understood and from such sources that its correctness is unquestioned. It is well known that there is no one method in the work of hatching and rearing which will prove equally resultful in all places and under all conditions. In order that this book may be sufficiently broad so that it may cover any case, we have included in it descriptions of the methods of not one but dozens of successful poultrymen, each of whom tells, practically, the story of his success. From these methods the reader may easily select that which seems best adapted to his environment and circumstances. By reading the book complete he will obtain a general knowledge of facts which apply to the industry as a whole which will make him far better prepared to handle successfully any difficulties which may confront him in his daily work.

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CONDITIONS THAT AFFECT FERTILITY.

Success in Hatching and Rearing Depends Upon the Health of the Breeding Fowls and the Manner in Which They are Housed and Cared For.

By F. G. Thayer.

Every season much disappointment is caused by a low percentage of fertility of eggs or the failure of such eggs to give satisfaction during the hatching season.

Fowls should be at their best their second season for breeding. If not forced they will lay large eggs which will hatch stronger and better chicks. A cock that is in his prime will get better chickens than it was possible for him to get as a cockerel. A method employed by many is to mate cock birds with pullets and cockerels with two-year-olds. All breeding males should be selected for their type, vigor and activity.

Health is the Foundation of Success.

The first thing to secure good fertility is good breeding stock that is standard and has health, vigor and good constitution. This is the foundation of successful incubation. Unless the breeding birds are sound, healthy and in the best possible condition for reproduction of their kind, satisfactory results cannot be obtained. With good stock we may expect, under proper conditions, to get a high percentage of fertile eggs. Eggs from birds out of condition, either from inbreeding, sickness, improper food or unsanitary surroundings will not produce the best results. Never breed from a bird that is sick or ever has had a severe sickness. Keeping the male bird with the hens will not insure strong, fertile eggs if his welfare is not seen to. If the hens are fat or dumpy the eggs will be infertile.

The number of hens to a male varies according to the breed and conditions under which the fowls are kept. Do not allow more than one male in the pen at the same time

as they will fight and in various ways increase infertility. Exchanging the male birds every four or five days is more likely to insure fertile eggs, but of course the males should be similar. When selecting a male bird we must not lose sight of the fact that he comprises one half of the flock. Therefore, select one that is vigorous, strong and well developed, and above all, is "boss." One vigorous, active, prepotent male will give greater fertility than three or four sluggish males. Breeding pens should be mated in the early part of January. By this means they become acquainted and are friendly when eggs are wanted for hatching. After pens are mated a week or ten days it is a good plan to test the eggs; if they are trapnested you can tell which hens are laying fertile eggs and thus avoid setting infertile eggs.

Nature's Conditions are Best.

Fowls on free range will produce a greater percentage of strongly fertile eggs than those in confinement, other things being equal. Whenever possible the breeders should be allowed outdoor exercise, but never in wet weather. In good weather when the grass commences to get green they can get good green food, insects and bugs which are essential to the best results in hatching, and insure a good fertility record. To insure the best results we must get as near the natural conditions of summer as possible; this means a variety of food, sunshine, warmth, fresh air, green material, cleanliness and freedom from dampness.

Exercise Essential to Fertility.

The breeders should be given as large a run as possible for exercise is essential to health and the breeding stock must be kept busy if fertile eggs and strong germs are desired. Fowls that are closely confined to limited quarters where they do not get exercise or have access to sunshine and fresh air, even though well fed, are almost certain to produce eggs low in vitality and weak in fertility. One of the best methods of making the hens exercise is to feed the grains in a litter of straw one foot deep and make them scratch for it. Thus exercising and feeding are combined for the best results. The house should be large enough to give them sufficient room to exercise. Fowls crowded in close

quarters, without enough exercise, will soon have impaired health and cannot, on any account, produce very many fertile eggs, and those that are fertile will generally hatch chickens that are low in vitality.

Feeding the Breeders.

Few stop to consider the importance of the influence of food on the breeding stock. Do not use too stimulating foods, as it will force the breeders, thus causing weaker germs. It would be wise to feed more on grains with meat and vegetables frequently until the fowls are wanted to perpetuate their kind. Then feed them on an egg making ration with the moist mash fed at noon, or with the dry mash before them at all times. The value of green material cannot be overestimated. It should be supplied in liberal quantities and include cabbage, turnips, carrots, beets, mangel-wurzels, potatoes, alfalfa or clover. Morning and night they work for food, composed of various grains scattered in the straw. Too much moist food will make watery eggs which will not hatch; or, if they do, the offspring will be weak in vitality. Grit, oyster shell and charcoal should be where the fowls can get them at all times. Fresh water is essential, and should always be within their reach.

Proper Housing is Important.

The breeding birds should be comfortably housed. This means that they should be in a reasonably warm, airy house. It need not be heated for better results are obtained in cooler houses. The safest plan is to provide a comfortable building, so arranged that it can be thoroughly aired and sunned daily while the birds are exercising. Fresh air is one of the most important factors in obtaining good fertile eggs that will hatch good strong chickens. Do not keep your houses tightly closed at night, but ventilate by means of cloth curtains. Keep the house clean and in good sanitary condition and keep the fowls free from lice and mites. Do not allow breeding fowls to run out on the snow and ice or to get wet in any way, as it will produce a shock to their systems which will reduce the fertility in the eggs. The curtain front poultry house is used at the Minnesota Northwestern Experiment Station with success. Dry, cool

buildings are more to be desired than warm damp buildings. Nothing will cause sickness any quicker than a close, damp, warm house.

Care of Eggs for Hatching.

Now comes the care of the eggs and here is where much trouble arises. Eggs for hatching cannot be handled too carefully. They should be gathered two or three times daily during hatching season so they will not get dirty, chilled or otherwise injured. Good, clean nests should be furnished, thus doing away with the washing of eggs.

They should be kept at a medium temperature, between fifty degrees and sixty degrees being considered best for good results. Reject all imperfect, small and large eggs, and keep for hatching only uniform, medium eggs. If kept at too low a temperature the chilling injures them; if, on the other hand, the temperature is too high, development of life begins. If kept in too dry a room eggs evaporate very rapidly, and on that account especially they should not be exposed to a direct draught of air. They should be turned daily in order to prevent the yokes adhering to the shell, in which case the delicate membrane near the germ may be ruptured when the eggs are turned. Eggs to be hatched should be as fresh as possible when set. The older the eggs become the lower the fertility and the less the number of vigorous chickens.

HOW TO BUILD AN INCUBATOR HOUSE.

The Requirements of a Successful Building in Which to Operate Incubators—How a Satisfactory, Inexpensive House Was Built on a Well-Known Poultry Farm —The Lumber and Other Material Required —Details of Construction.

By Fred E. Dodge.

Next to owning good incubators, the most essential thing on all successful poultry farms is having a proper place in which to operate them. Whether large breeder or small fancier, real success depends a great deal upon equipment; the best incubator made operated in a poor location has little chance to bring off good hatches of strong, healthy chicks.

Incubators are found running in almost as many places as there are people running them. Some are operated in the front parlor, the attic, a spare bed room, or in the kitchen, where the rapidly changing temperature raises havoc with the regulation, and the steam from cooking, in some instances, warps the cases or supplies too much moisture to the eggs. The parlor is a favorite place, but the temperature varies there also. A majority of the incubators will be found in cellars under dwellings.

Cellars Are Not Proper Places for Incubators.

Most cellars are too damp, are poorly lighted, and are seldom, if ever, well ventilated. In nine cases out of ten, the cellar is a poor place to put an incubator whether you are hatching with it or storing it. The dampness is apt to warp the case and put the machine in such condition that it will need to be run a week before the eggs can be put in.

A season or two of running incubators in such places will show the necessity of having a special building or room in which to operate them, if good hatches are expected to

be brought off when all other conditions are favorable. Some think it too expensive to build a house for one or two machines, not knowing that a good one can be built at a low cost. It is the object of this article to describe such a house, one that is not only cheap to construct, but which has the essential features.

I have designed this house in a simple manner and have tried to make the drawings so that anyone not skilled in the use of carpenter's tools may build it themselves. The tools required are a spade, pick, hammer, saw, square, and level; tools that are found in almost every place.

Essentials of a Good Incubator House.

Having decided to build an incubator house, it is not a problem of how to conveniently cover a hole in the ground, but one of how best to build this covering that it may fully perform its functions. To successfully accomplish this, one must have knowledge of the requirements of such a house. The following are a few of the essentials and if your house will not fulfill all of them as near as practicable, when finished, it is useless to go to the expense of constructing it; the house cellar will do as well and will cost you nothing as it is already built:

First. The temperature within should remain nearly stationary at all times, regardless of external changes.

Second. It should have a system of ventilation that ventilates without causing a direct draft on the machines. Ventilation is the life of incubation; without the life giving oxygen it is impossible to develop the embryo chick.

Third. There should be plenty of sunlight in the house. This will keep it sweet and clean and free from moldy growths. Direct sunlight, if allowed to enter all day, will heat up the interior, but this may be overcome by tacking muslin curtains in front of the windows and having them arranged so that they may be slipped back when desired.

Fourth. It should be built on a high spot so that it will be dry the year around.

Fifth. The temperature within should be about fifty to sixty-five degrees, then eggs for hatching may be stored in places not occupied by incubators. If this house is well

covered with dirt the temperature within in the summer will be about sixty-five degrees.

Sixth. The volume of air in the whole room should be great enough so that the air will not become poluted with the lamp gas before the ventilators can remove the latter. It should be between seven and eight feet from floor to ceiling, which will give the desired volume.

Atmospheric air is not a simple substance, but a mechanical mixture. Oxygen and nitrogen, the principal constituents, are present in very nearly the proportion of one part of oxygen to four parts of nitrogen by weight. Oxygen is one of the most important elements in the air; it is the active element in the chemical process of combustion and a somewhat similar process takes place in the lungs of human beings. The lamp on the incubator, while burning, consumes the oxygen in the air and throws off a gas called carbon dioxide or carbonic acid gas. Being 1.5 heavier than air it falls to the floor and there piles up like water filling a hole unless removed as fast as it is formed. This is the reason that the middle ventilator (see Fig. II) extends to within six inches of the floor and does not terminate near the roof like the first and third. If this gas is allowed to accumulate in the building it will get into the egg chamber of the incubator as nearly all incubators take in fresh air near the floor. If this gas is allowed to appear in quantity and allowed to remain long it will kill all the living germs in the eggs. I do not doubt that this is the cause of many failures with incubators. Having learned the main essentials of an incubator house, the mechanical construction comes next in order. This is a simple matter for the greatest problem is to know in what manner to build it.

Making the Excavation.

After the frost is out of the ground in the spring, select some high and dry spot and dig a rectangular hole in the ground 9 x 11 x 4 feet, have the sides sloping so that the floor of the cellar will be 8 x 10 feet. This should be dug with the long way east and west. At the center of the west end dig out the place for the stairs. At the surface this should measure 3 x 6. If in clay soil the steps may be made by digging the clay in the form of steps. These steps

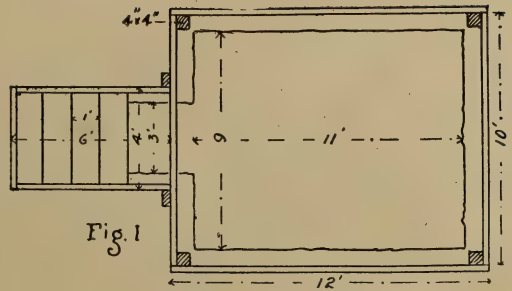


Fig. I

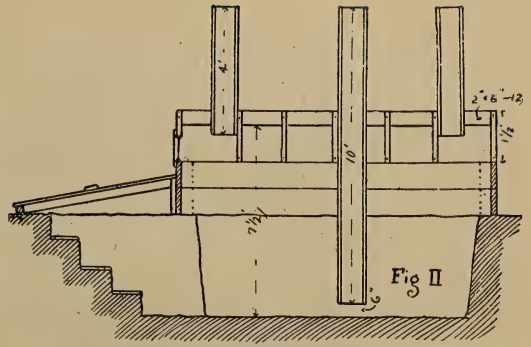


Fig II

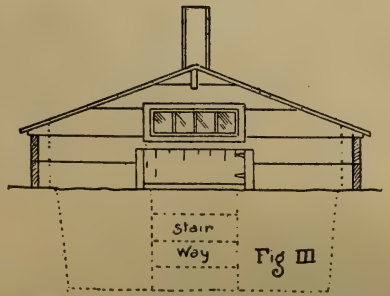
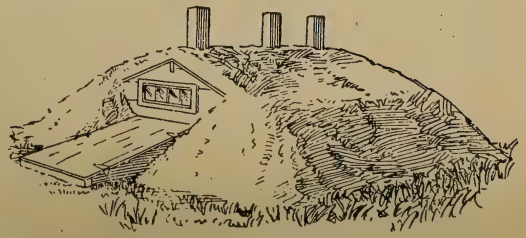


Fig III



Drawings Showing the Manner of Constructing Fred E. Dodge's Incubator House and Illustrating the Finished Structure.

should have a one foot tread and a fall of one foot, then there will be four of them. Loose boards three feet long and one foot wide can be placed on the clay, thus forming stairs at little cost.

In throwing out the dirt care must be taken to throw it well away from the hole so as not to interfere with the carpenter work. If the soil is damp when the cellar is dug, it is well to leave it open to the sunlight for a few days to thoroughly dry it out before putting on the roof.

The Lumber Required.

The next thing in order is to buy the lumber. As this is to be built as cheaply as possible do not buy a foot of lumber that does not enter into actual construction. Following is a bill of the lumber, etc., required.

4 pieces 2 x 12, 10 feet long.
4 pieces 2 x 12, 12 feet long.
1 piece 4 x 4, 8 feet long.
9 pieces 2 x 4, 12 feet long.
1 piece 2 x 6, 12 feet long.
15 pieces 1 x 12, 12 feet long.
3 pieces of 8-inch flooring (for door).
8 pieces 1 x 12, 10 feet long (for ventilators).
2 three-light windows with 8 x 10 glass.
2 lbs. 20-penny spikes.
3 lbs. 10-penny nails.
1 pair of large strap hinges.
2 pair small butt hinges.

Constructing the Wood Work.

Saw the 4 x 4 into four pieces each two feet long. With these and the plank build a rectangular box 10 x 12, two feet high, as shown in Figure I. This must be made with square corners and when finished be leveled up by placing small pieces of board under the low places. Figure II is, in part, a longitudinal section of Figure I. The drawings, I and II hardly require explanation and the frame may be built with little trouble.

Now take the 2 x 6 and place it in the center and one and a half feet above the frame just made. Support it temporarily, then measure and cut the 2x4 pieces for the rafters

and spike them in place. Figure II gives a plan and elevation of this work, and will explain the work in a more simple manner than words.

Take the one foot boards ten feet long and build two square tubes ten feet long; saw one in two in the middle. These are the ventilators and are placed by sawing out a place 2 x 10 inches in one end and placing this over the 2 x 6; nail to it as shown in Figure II.

The roof boards can now be put on and covered with tar paper and then the whole building covered with two feet of earth. A frame for the door is made by sawing two pieces 2 x 4, six feet long and one piece 4 feet and nailing together and to the building as shown in Figure I.

Saw the eight-inch flooring the right length and nail to two-inch boards six inches wide; this will form a bulkhead door for the entrance. Be sure and have dimensions so it will fit the frame, as shown in Figure I.

Take the three-light windows and make a frame for them in the gable in each end of the roof as shown in Figure III. Hinge them at the bottom so they will swing in and deflect the air towards the ceiling. Board and cover both ends with earth as much as possible and the cellar is finished.

If there is any doubt as to the method of procedure, a careful study of the different drawings will clear it up.

Incubator Chicks Enjoying the Morning Sun.

SUCCESS WITH INCUBATORS.

The Location of an Incubator and its Influence on the Hatch —The Value of an Even Temperature and Pure Air—Care of the Machine in Operation.

By F. G. Thayer.

The question arises where shall incubators be operated and what are the requirements for their successful operation?

Do not buy a good incubator and operate it in an unfavorable place and then blame the manufacturer for your poor hatches.

Incubators are run in nearly every conceivable location, many of which are unfavorable to the best results. Some of the places where they are operated are damp, poorly ventilated cellars, parlors, sitting rooms, attics, barns, poultry houses, and, best of all, specially constructed incubator houses or cellars, separate from the rest of the buildings.

The Advantage of an Incubator House.

The reason why better results are obtained in specially constructed houses is that everything is made as convenient as possible and conditions are at their best. Machines operated in other places are at a disadvantage in many ways. Above ground, in a dwelling house, the machines require more attention as the variations in temperature, moisture and atmosphere are greater and must be adjusted accordingly. The incubator house should be put up early in the season, so that it will become thoroughly dry, and should be located on high, dry land. The house should be so located that perfect drainage is to be had throughout the year. A separate house will pay for itself by the larger percentage of chickens hatched in it. A house entirely above ground is at a disadvantage when hatching is carried

on in warm weather; the house partly underground is cooler and the temperature is more even.

Construction of Incubator House.

The incubator house should be built three to four feet into the ground. The walls should be built of brick, stone or of grout and rise two or three feet above the level of the ground. The floor should be made of cement on a good foundation. On top of the ground wall should be placed your windows which should be double, those outside being hinged at the top, the inside ones hinged at the bottom, so avoiding direct draft on the machines when windows are open. They should also be fitted with cloth curtains so that the intense rays of the sun will not affect the temperature or moisture in the room. By placing muslin curtains in the openings in the ceiling and end of the building thorough ventilation can be obtained. At one side should be built a dark room where eggs can be tested in the daytime as well as at night, thus doing away with much unnecessary night work. Another partition should inclose another room where eggs can be kept for hatching under proper conditions.

Conditions Surrounding the Incubator.

A damp atmosphere without the machine is better than dry, heated air. When the air without is dry, the floor should be moistened with water. An even temperature is desired for best results. The temperature of the room should be about fifty degrees Fahrenheit. Thorough ventilation is essential for hatching vigorous chicks. Oxygen is necessarv for the embryo; lack of it causes poor hatches and weak chickens. As the lamps consume oxygen in burning and throw off carbon dioxide, plenty of fresh air must be admitted to the room. If the machine is run in a living room more moisture is needed, and in every case extra care should be taken to provide a supply of fresh, pure air. In low lying sections and near lakes or large rivers, where fog or much humidity prevails, no additional moisture is needed, while a considerable amount of ventilation is required. In a rarified atmosphere, a very considerable amount of moisture is necessary to secure even a fair hatch,

and not nearly as much ventilation is needed. Kerosene odors and exhausted air are very injurious to the hatch and must be removed by ventilation.

Operating the Hatcher.

In running the incubators use nothing but the best of kerosene as less smoke and soot will result. It is best to trim and fill the lamps in the morning, and do all necessary regulating of machines at the same time so that you will not have to stay and watch the machines at night to see that nothing goes wrong.

Incubators should never be jarred when in use. Very clear practical instructions come with each machine and should be carefully followed. Never allow the sun to shine on the incubators as it causes the temperature to rise. Use a spirit level on top of the incubator, to test it, from back to front and from side to side. Block up under the legs of the machine until you get it level. If the body of the incubator is not level the egg chamber will not heat evenly. Be sure it sits firmly.

Fill the egg tray with as many eggs as will go in easily, but do not pile them up or attempt to double up by placing eggs on top of a full tray. Keep the incubator lamp clean so it will give you a clear, steady, bright light. Put in a new wick when starting each hatch. Follow the instructions that come with each machine.

Advantages of Using Incubators.

With an incubator you can hatch chickens out of season and on a large scale. Your machine is always ready when you desire to start. It is cheaper to run incubators than it is to use hens for hatching large numbers of chicks.

It enables one to start his chickens absolutely free from lice. The incubator does not break eggs like the sitting hen. It saves time that would otherwise be employed in caring for many sitting hens.

HATCHING AND REARING THE CHICKS.

Incubating and Brooding by Natural and Artificial Methods —The Necessity of Obtaining Strong, Fertile Eggs—Operating the Incubator—Taking Off the Hatch—Brooding and Feeding the Chicks—Dry Feed Versus Damp Mashes—Free Range for Future Breeders.

By H. A. Nourse.

No poultryman has ever achieved success in the poultry business sufficient to make a profit, who has not been able to produce strong, healthy chicks, and to so care for and feed them that they will grow rapidly and develop properly. While there are no momentous secrets connected with this work, there are certain matters and conditions which must be right, or the results will not be satisfactory.

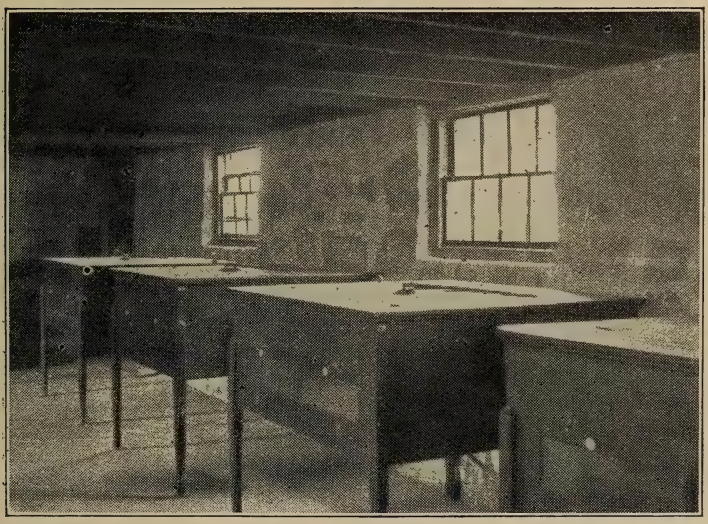
Strong, fertile eggs are of primary importance and such eggs are produced by none other than healthy, vigorous stock. Other eggs may hatch and the chicks may live and grow, but they will not return a satisfactory profit on the money and time invested. Upon the condition of the breeding stock, then, depends to a great extent the success of the season's work.

No one attempts now-a-days to hatch many early chicks without the use of incubators. The use of these machines has practically revolutionized the business of hatching and rearing, and where one plant was found ten years ago that hatched 500 chickens before April first, fifty are found today. Artificial hatching is no longer an experiment. It has been proved time and time again that better hatches can be produced at less expense by artificial than by natural methods, if a considerable number of eggs are incubated.

The Location for the Incubator.

Although an incubator will operate successfully under

adverse conditions, there are certain circumstances which the best machines cannot overcome, and which uninformed operators occasionally throw around them. Some years ago, a cellar was considered by far the best place in which to operate a machine, the main idea being to secure a place having a fairly even temperature. Since, it has been discovered that, although uniformity of temperature is desirable, ventilation and some sunlight are fully as important.



Corner in a Substantial, Well Lighted Incubator House Which is Below Ground to the Sills of the Windows.

The oxygen of pure air is very essential to success in this work and good hatches of strong chicks cannot be obtained when the machine is surrounded by foul air. The most satisfactory incubator rooms are partially below ground but have two or more feet of each side, or at least the south side, above ground, with sufficient window space to admit plenty of light. Effective ventilation is more difficult to provide in such a building than the one which is wholly above ground, but if air is admitted near the ceiling through

cloth diaphragms and drawn out from near the floor through vertical pipes which extend up through and above the roof, satisfactory results will be obtained.

Operating the Incubator.

The incubator is not by any means difficult to operate. One of the mistakes most frequently made, especially by beginners, is buying a machine late in the season, very near the time when it is desired to operate it. It should be remembered that spring is a busy season for the incubator companies, and that it is sometimes impossible for them, however well equipped they may be, to fill an order the same day as it is received. Again if they are able to do this, there is no certainty that shipments will not be delayed by the transportation companies. Instances are on record where incubators have been delayed a month when the shipping distance was less than two hundred miles. It is advisable for every beginner to have his machine some time before he desires to fill it with eggs in order to become fully acquainted with its operation.

Most machines are shipped practically ready to run, it being the work of but a few minutes to put on the regulator and adjust it, screw the legs on and place the lamp in position. Every machine should be level before it is started and it is best if it stands upon a firm foundation where it will not be jarred materially during the season. Although it is possible to operate an incubator in a moving freight car, it is not advisable to subject the machine to such conditions when it is not necessary.

Three or four days should intervene after the heat is turned on before the eggs are placed on the trays and incubation started. This is required to get the machine thoroughly dried out, warmed through in every part, and the regulator exactly adjusted. The burner of the lamp should be thoroughly cleaned frequently and the wick trimmed once each day, preferably in the morning. All flues through which the direct draft from the flame passes should be cleaned thoroughly once a week if they can be reached. A swab on the end of a pliable wire is the best tool for the purpose.

None but eggs of normal size and shape should be used

for hatching in incubators or under hens. Some writers advise sprinkling the floor under the machine, sprinkling the eggs, placing damp cloths and sponges on the egg trays and other means of supplying moisture. In most cases these are not only unnecessary, but detrimental. Sprinkling the eggs is not at all to be advised, because when the moisture evaporates, it cools the shells of the eggs more or less, even though the thermometer may not show any difference in temperature.

Care of Eggs During Incubation.

Upon the length of time that eggs should be cooled during the process of incubation and upon when the cooling should take place, opinion differs considerably, and a few incubator operators deny the advisability of cooling at all. It is the opinion of the majority, however, that intelligent cooling is necessary in order to secure the strongest chicks. Obviously it will not do to take the eggs out of the incubator and let them stand long in a low temperature such as frequently surrounds incubators operated in the winter or early spring. In such cases the cooling that the eggs receive when taken out of the machine and turned is all that they can stand to advantage. When the temperature of the air in the room is fifty or above, the time that the eggs may be left out of the machine may be increased from that required to turn the eggs and replace them in the machine to from ten to thirty minutes towards the end of the incubating period, according to the temperature of the air surrounding them. In a temperature of seventy or eighty degrees, it is perfectly safe and perhaps advantageous to allow them to remain out half an hour on each of the last five days before pipping time. Instances abound where eggs have remained out of the incubator over night under these conditions, yet have produced a good per cent of strong chicks at the end of twenty-one days.

The majority of successful incubator operators do not touch the eggs after placing them in the machines until the end of the third day when they are turned for the first time. After that they are turned regularly, morning and night until the eggs begin to pip, as it is called, or until the chicks first crack the shell. The instructions that the manufac-

turers send out with each machine should guide the new operator, at least until such time as experience shall prove that different handling of the machine will produce better results under the particular conditions to which his incubator is subjected. This refers to matters of ventilation and moisture in particular.

Taking Off a Hatch.

It is unwise to make haste to remove the chicks from the incubator even after the hatch is completed. A good hatch is almost always finished at the end of the twenty-first day, and the trays, shells and unhatched eggs should be removed. The chicks may remain in the incubator twenty-four to thirty-six hours longer with advantage to themselves and convenience to the poultryman. To remove the chicks from an incubator in which the temperature is above one hundred to a brooder having a temperature of ninety-five, and in which there are likely to be currents of air, is to invite trouble from the very first. Even if the brooder temperature is as high as that of the incubator from which the chicks are removed, the tempering off process cannot be as successfully performed as in the incubator.

When the trays are removed, the temperature can be gradually reduced to ninety or ninety-five degrees during the following thirty-six hours. The chicks may then be removed to the brooder with the least chance of loss from influences incident to the change, and they will be stronger and better chicks. For removing to the brooder, especially if it is necessary to carry them from one building to another, a basket lined with flannel is to be advised, and if the weather is severe, the basket should be wrapped with a bran sack for additional protection.

There are various kinds of brooding apparatus in use, most of which give satisfaction if the care-taker understands his work and gives it the required attention. The principal requirements are: ability to furnish the proper degree of heat at all times, freedom from drafts under the hover and sufficient ventilation so that each chick will obtain plenty of fresh air in whatever part of the brooder he may be. Some poultrymen prefer pipe system brooders, that is, those heated by a system of pipes through which

hot water circulates, while some prefer the individual brooders made and advertised by incubator companies and heated by kerosene lamps and stoves.

For the poultryman who has less than 500 chicks to rear in a season, the individual brooder equipment is less expensive and is usually satisfactory. Occasionally on large farms where the number of chicks produced annually runs into thousands, we find most of the brooding, especially of the young chicks, done in lamp brooders.

Where to Place the Brooder.

The use of the pipe system requires a well built house

Interior of a Brooding House, Showing the Pipes Which Heat the Hovers and Also the Four-Inch Cast Iron Pipes Which Warm the House.

but when individual brooders are used, a shed is frequently sufficient to protect them except in extremely cold weather and it is not impossible to operate out-door brooders during the severest winter weather without any protection whatever, though such a practice is not advised. An out-door brooder placed in a shed which is provided with a curtain front to be let down in stormy weather can be used successfully in the winter months, if the heat capacity is sufficient, and the chicks will derive much benefit from the pure air received. In-door brooders, unless so constructed

that they will protect the chicks from the cold when they are outside the hover, must be run in a well-built house until the moderate weather of the late spring arrives. It must be remembered that whatever building is used it must be well ventilated, because when there is foul air in the house the air is foul in the brooder. This condition is responsible for the death of more chicks than is improper feeding.

Sunlight is of great importance and if the brooder can stand so that it will be reached by the sun's rays a few hours each day, that will do much to assist you to raise healthy chicks and if the hover is removed so that the sun can shine directly upon the brooding floor, it will do much to purify the machine.

If the brooder has been used before, even though nearly a year has passed since it was last occupied, it should be completely cleaned and the brooding apartment washed throughout with soap and hot water in which is mixed a little carbolic acid. This will thoroughly disinfect it and the chicks will not be in danger of being attacked by germs that may have been left by the last brood occupying the machine.

The best material for bedding the brooder is fine sand for it not only provides good footing for the chicks but also furnishes considerable grit. Some poultrymen prefer to use dry bran and some use hay chaff. The writer has used both and considers them good, but prefers the dry, fine sand.

The temperature should be fairly stationary at ninety degrees for twenty-four hours before the chicks are put in, in order that the machine may be thoroughly warmed and dried. When the chicks are put in, the temperature will rise to from ninety-two to ninety-five degrees.

Fifty Chicks to a Brooder.

Not more than fifty chicks should be placed in each brooder, or in each apartment of a pipe system apparatus, no matter how large the brooder or apparatus may be. More than fifty chicks are always likely to crowd and do themselves damage in other ways. Some of the most successful poultrymen seldom put over forty chicks in one

flock, and others assert that better results are obtained when not more than thirty occupy one brooder.

The First Food.

We usually place the chicks in the brooder in the afternoon or evening and confine them pretty close to the hover until the next forenoon, when we offer the first food. The prepared chick foods, manufactured especially for the purpose and advertised in poultry journals, are convenient and satisfactory to feed from the very first. These foods con-

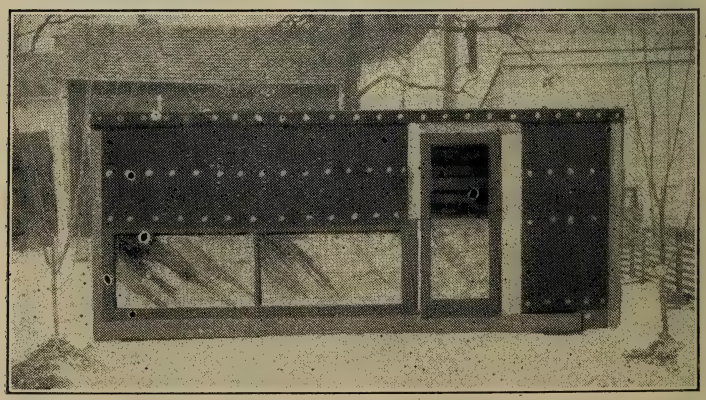
Interior of a Brooding House Equipped With What is Known as a "Box" Hover. This Hover is Open Only at the Front, Into the Pens, and is Heated by Hot Water Pipes.

sist principally of finely cracked grains with a little grit, some charcoal and some beef-scraps added. They may be fed in a litter of hay chaff or some such material, or, if the chicks have sufficient range, it is often satisfactory to feed them in hoppers from the start. Usually, however, it is better to scatter the food so that the chicks can exercise in finding it. Fine grit should also be scattered about the brooder, outside the hover, with the chick food. Fresh water should be constantly within reach. Sweet milk is an

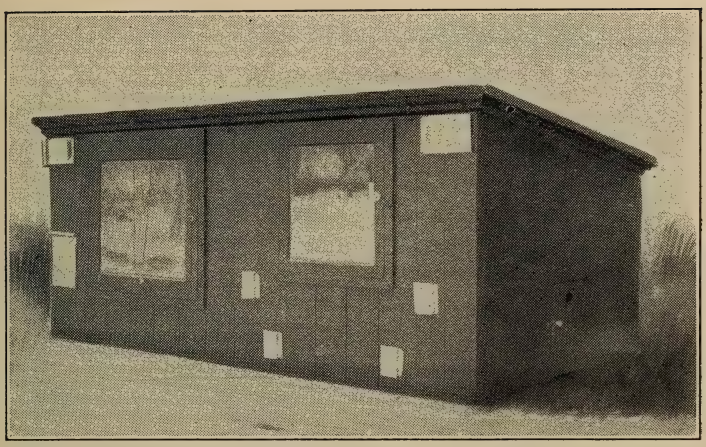
excellent food for young chicks, but will not take the place of water which must also be supplied.

Although the temperature under the hover should be 92 to 95 degrees the first few days, it is not advisable to keep it so warm after the third day. Ninety degrees is sufficient for the youngsters until they are ten days old, after which the temperature should be gradually reduced until it is eighty-five at the end of the second week and not over eighty at the end of the third week. On the matter of heat, well-known authorities differ considerably. Some claim that eighty degrees is sufficient any time after the chicks are four or five days old while others claim to have better results when a heat of ninety or more is maintained until the end of the third week. Our experience has indicated that strong, healthy chicks which have plenty of pure air to breath do not require a high temperature after the first ten days. Chicks kept in a brooder which is poorly ventilated or which is operated in a building which has not adequate ventilation will crowd toward the warm corners of a brooder when the temperature is ninety, more than will a flock which has plenty of pure life-giving air to breath in a temperature of eighty degrees.

The little chicks need plenty of room in which to exercise,



A Coop Eight Feet Long and Four Feet Wide in Which an Indoor Brooder is Operated.



An Outdoor Brooder in Which Chicks May be Reared in Warm or Cold Weather.

but when they are only a day or two old, they should not be allowed to run far enough from the brooder so that they will not return when in need of warmth. If the brooder has a liberal floor space outside of the hover, they may be confined to the machine for the first three or four days and for a longer time if the air surrounding the machine is very cold.

After the first of May, the temperature is not likely to be too cold for the chicks outside and they should be induced to take exercise in the open air. The youngsters must be taught to return to their hover, a lesson which sometimes takes them some time to learn and taxes the patience of their care-taker. But by allowing them to have a little more range each day and driving them back to the hover occasionally, they soon learn where they should go when chilly or in need of rest.

When the chicks are brooded in a building, it is not often advisable to let them outside of the building before they are a week old, but doors and windows should be opened so that the air within will be perfectly pure. After they are a week old they may be allowed to run outside in a gradually increased inclosure. A yard ten by forty feet should

prove sufficient for a flock of forty to fifty chicks until they are six weeks old.

Green Grass an Advantage.

Chicks should always have a grass run because the grass is needed to furnish green food for the chicks and because the roots in the sod absorb many of the impurities and tend to keep the runway from becoming foul. Frequent raking and occasional watering in dry seasons will assist in keeping grass in the runs, and such labor is usually paid for with interest by the increased vigor and growth of the chicks.

Dry Food Fed in Hoppers.

If each brood has the room we have described, they may be given dry food in hoppers and the labor of feeding is reduced to the minimum. For this purpose, the advertised chick foods are especially adapted. The writer has had success when feeding these foods in hoppers of different styles, filling the hoppers perhaps twice a week and furnishing fresh water twice a day. With one brood in particular which was placed in a brooder in a colony house, the brooder was attended but twice a day, morning and evening, at which times the water pan was refilled, the lamp attended to and the brooder cleaned. This was in June and when the chicks were four days old, they were allowed to run outside the house in a small yard. The youngsters made excellent growth and the mortality was very low.

Damp Mashes Occasionally Advisable.

Less than twenty per cent as much damp mash is fed to chicks at present as was fed five years ago. Still, occasionally breeders find it satisfactory, and a few deem it necessary to get the best and fastest growth and most uniform development. A large proportion of these poultrymen do not, however, feed mash until the chicks are weaned by the hen or until they no longer need artificial heat.

Mashes mixed with milk or water may be fed even when hopper feeding of dry food is practiced and oftentimes will produce better results than can be obtained otherwise.

The prepared chick foods, composed of small grain and finely cracked larger grains with beef scraps added, although most satisfactory for feeding young chicks, are

not as a rule intended to be fed to growing chicks that have reached an age of a month or more. When the chicks are four weeks old whole wheat and cracked corn may be substituted for part of the chick food furnished and the proportion gradually increased until the chick food is entirely dispensed with at the end of six weeks. This, of course, does not refer to the various foods prepared and sold especially for feeding growing chicks. Many of these are well-balanced rations and are convenient and economical to feed. Where these cannot be conveniently obtained, cracked corn, whole wheat, beef scraps and charcoal will make a satisfactory combination for chicks that are on free range where they can obtain grit, green food, bugs, worms, etc., and will produce vigorous, healthy growth until the chicks go into winter quarters.

For chicks that are confined in yards a more varied ration is necessary. To the cracked corn and wheat may be added hulled oats and grit; beef scraps and charcoal may be fed in separate hoppers or if mash is added, whether dry or damp, the beef scraps may be mixed with that to make eight per cent of the mixture by bulk. The other parts of the mash may be cornmeal, ground oats and bran in proportion of one part cornmeal, one part ground oats and two parts wheat bran. If this is fed damp it should be mixed with milk, whole or skim, if it can be obtained at reasonable cost.

Free Range for Future Breeders.

Some of the best and strongest chicks that appear in the fall and winter shows are raised in very limited quarters, but good growth and proper development in such quarters are obtained only by those who thoroughly understand the business and who attend very carefully to the work.

Five-hundred chicks properly cooped on free range may be as easily cared for as one tenth that number confined in small yards and usually the former will make faster and more satisfactory growth. The yarded chicks must not only be provided with a variety of food which must include plenty of green food, preferably short, tender lawn grass, but they must have artificial protection from the heat of the sun and from danger of poisoning from the infected ground.

Hopper feeding is seldom successful when chicks are without range though it may be used with advantage where free range is enjoyed. The free range chick needs no mash food unless it is necessary to force a more rapid growth than is usually desirable. The component parts of the mash may be mixed dry and placed in hoppers, one hopper near each coop. Another hopper at each coop should contain a mixture of dry grains including cracked corn, wheat and oats, or, it may be divided in sections and each variety of grain placed in a section by itself. Another hopper or box should contain charcoal, which is one of the best and cheapest preventives of digestive disturbances. This may seem to some to be considerable equipment for each brood of chicks, but when you have added the water fountain and located it in a satisfactory place, you are enabled to care for your flock by visiting the coop twice a day. In the morning the chicks may be let out and fresh water furnished. In the evening, after nightfall, the caretaker should make the rounds of the coops and close them for the night. This latter proceeding may be dispensed with if there is no danger from hostile animals.

The hoppers may be refilled as often as the supply is nearly exhausted, but they should be of sufficient size that not more than two fillings per week will be required. The coops should be cleaned twice a week and fresh sand or loam placed upon the floors. Floors may be dispensed with in case the coops are on high ground, dry land, and there is no likelihood of marauding animals digging under the coops and attacking the occupants.

This is the sum total of the work required to care for the chicks, unless the presence of lice makes it necessary to paint the interior of the coop with lice killer occasionally. Vermin seldom get a foothold on birds that have free range and were properly cared for and free from lice before they were weaned.

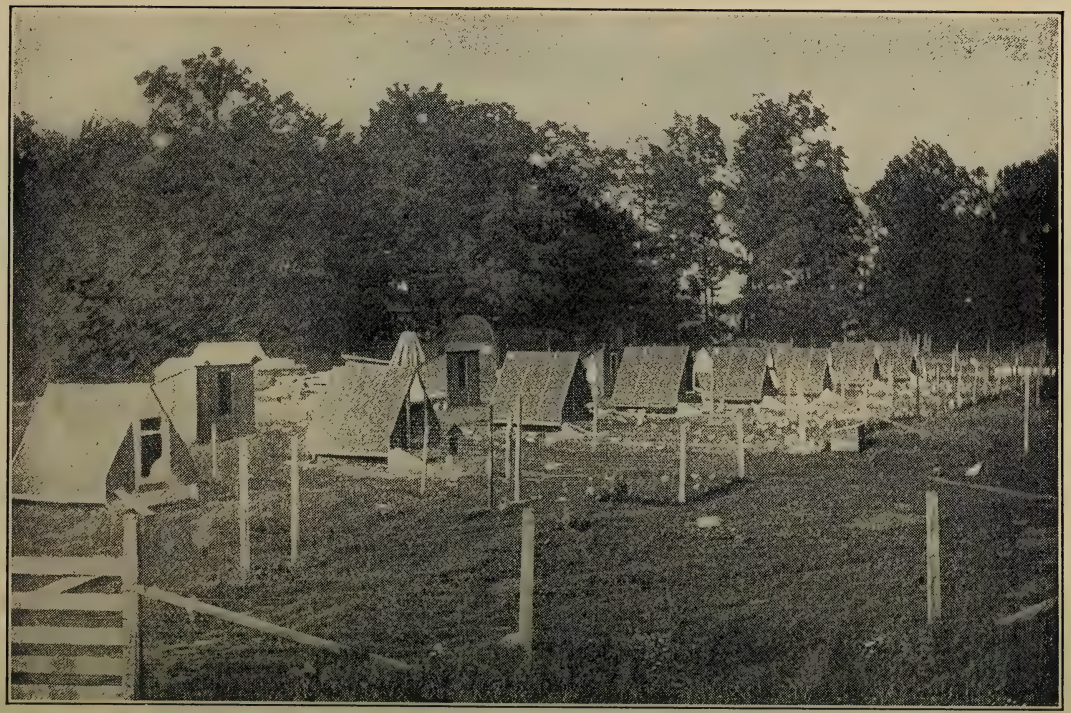
A Satisfactory Colony Coop.

A coop for fifty chicks should be six feet long and four feet wide, four feet high in front and two and a half feet at the rear. It may be built with or without a floor, according to the requirements. The entire front may be of wire

or slats, part of which should be cleated and hinged to serve as a door. To keep out heavy winds and rain a curtain of burlap or light cotton cloth may be arranged to be buttoned to the front of this coop or rolled and fastened at the top to be let down in severe weather. During the heat of the summer season even such light protection occasionally makes the interior of the coop too warm and a protection built of boards about six by five feet in size may be laid against the front with its base a foot or more away from the base of the coop. This may be fastened to the coop proper

A Colony Coop With Open Front and With a Hood to Protect the Interior From Sun and Rain.

with hooks and lets in plenty of air while cutting off hard winds and driving rain. No roosts are required in these coops until the chicks are two-thirds grown, when pieces of two-by-three laid flat-wise with the two upper edges rounded may be placed two in each coop. These should be made to fit closely between the ends of the structure and can be supported by cleats nailed to the ends of the coop, eighteen inches above the floor. The chicks will prosper in such coops until cold weather compels their owner to transfer them to winter quarters.



Colony Brooder Houses Used by Cornell Experiment Station, Designed by James E. Rice.

ARTIFICIAL HATCHING AND REARING.

Imitate Nature's Method—Both Eggs and Machine Should Be Aired—The Value of Sunlight—First Days in the Brooder—Feed Dry Food in Litter.

By Anna L. Pinkerton.

Having in mind the many queries that are constantly being put to me by beginners in the poultry business, I fancy that a few words of advice to the amateur would not come amiss and all my remarks apply to the different high grade machines now upon the market with which I am familiar.

Leaving technical terms and statistics alone I will at once come to the point with advising the intending user of an incubator to first of all take into consideration his surroundings and climatic conditions, before setting the machine, conditions being so different in various parts of the country that it is impossible to make rules that would apply everywhere.

Remember, always, the best criterion that can be taken is the hen; find out the methods under which she is successful and follow them as closely as possible when running your incubator. Her methods combined with your own ingenuity cannot fail to bring you success.

Of course, everything depends upon the eggs and many an incubator has been condemned as useless on account of the infertility of the article to be hatched. It is a good thing to bear in mind that the incubator is only a medium which, with moderate attention, is bound to produce good results, and no workman, no matter how clever a mechanic he may be, can do good work with poor tools.

While running an incubator it is as easy to be over anxious as to be careless and it will be well to bear in mind that it is a far more dangerous thing to let the temperature within the egg chamber get too hot than it is to let it get

too cold, as the one will destroy your hatch, while the other will, at the very worst, only delay it a day or so.

Air Both Eggs and Incubator.

Having secured the most fertile eggs that you can procure and started your incubator for its three weeks' run, be sure not to let a day pass after the second day without taking the egg tray out of the machine and turning the eggs well, allowing them time in which to air and cool, at the same time leaving the doors of the incubator open to allow it also the benefit of a good airing. It is just as essential to air the incubator as it is to turn the eggs, it being one of Nature's laws that birds leave the nest in order to air themselves as well as the eggs, and it is obvious that the eggs should not be put back into an atmosphere that has the slightest impurity about it. My method of turning the eggs is by taking a few out at the center of the tray and shuffling the others with the hands in the same manner that a hen does with her beak and body. Keep away from mechanical movements or anything pertaining to mechanism as much as possible. Nature is erratic and while we are imitating Nature we must be erratic also. This has been my experience and I have carefully avoided anything mechanical in the hatching and raising of poultry.

I have always had the greatest success with incubators when they have been set in a place that is partially below the ground and I advise setting the machine in a basement rather than upstairs, provided there is sufficient air in the basement for ventilation.

Fresh Air and Sunlight Essential.

Another important thing to remember is fresh air never injures anything; it is drafts that kill, and it is injurious to place your incubator in a draft. Fresh air and sunlight are as essential to health as they are useful for the destruction of impurities and it is therefore necessary that the incubator room is well lighted and well aired. If your incubator has a glass door through which you can see the eggs do not fail to cover it during the weeks of incubation for the purpose of excluding the light. There are several reasons for this, the two most important being that Nature

is directly opposed to light in the production of life, and that when the days for pipping arrive and the little chicks at the back of the incubator are leaving their shells they will naturally try to crawl over the pipped eggs in order to get to the light which they can see through the glass door. In doing this they will cover over the pipped eggs with the glutinous substance that is clinging to them which will seal the holes in the eggs and of course kill the little live fellows inside. If the interior of the incubator is dark this can never happen as the chicks will remain just where they are, when they leave the shell, until dry and can be taken out when the operator deems it advisable.

My concluding suggestion is, follow the instructions that accompany the incubator as closely as possible as the people who make the machine should surely be the best judges of how it can be run most successfully.

Why Women Succeed.

The success of women in business undoubtedly has been due to the fact that they are more ready to attend to the minor details than men and this is especially true in the case of poultry raising. One seldom or never hears of women poultry fanciers failing and the explanation is very simple, nobody fails who attends to the details of his or her business. This is true in all cases, for those little details that some people are apt to treat as insignificant and beneath their notice are very often the undoing of what would otherwise be a successful enterprise.

I feel confident that any woman with the most elementary knowledge of business methods can make a success of raising poultry and I do not know of any business that can be started with as small a capital and show as good results in the same length of time. This introduction to my brooding article may seem somewhat out of place but I wish to impress upon my readers the importance of attending to little details.

Here are a few things to always remember. Don't keep more than fifty young chicks together at any time; feed little and often; dirt always encourages disease; clean

water is as important as clean quarters; sunlight and fresh air are as necessary as food.

The Secret of Success.

The secret of success is undoubtedly strict attention to the instructions that accompany the brooder and constant care of the chicks for the first few weeks after they leave the incubator. I have never been in favor of anything too mechanical in connection with incubators and I am still more prejudiced against a too-mechanical use of the brooder, for the more the operator has to attend to the little ones the stronger and healthier they will be and the smaller will be the death rate as a rule. Take your baby chicks from the incubator in the evening as they will then be undisturbed by the light and will sleep comfortably until the next morning.

Do not be guided too much by the thermometer for the little fellows make pretty good thermometers themselves and there is not much fear of them becoming too hot if they can retreat to where the temperature is cooler than under the hover. Quite a good plan is to fasten up one of the woolen flaps of the hover for the first two or three days in order that the chicks may find their way in and out easily and to occasionally remove the hover entirely in order that fresh air may enter and more especially to see if there are any weak or lazy chicks behind. Many a stupid or weakly chick's life may be saved by helping it when it is not inclined to help itself.

Do not put the food (dry grains) into any kind of feeding device but scatter it in the litter upon the bottom of the brooder, or runway, in this way making them work for all they get. Exercise promotes health and cannot be commenced too soon.

Always prevent the youngsters from crowding or huddling together. In a well constructed brooder they are not apt to do that but it is well to be sure that they don't, as it is bound to cause trouble and will result in the loss of some of your chicks.

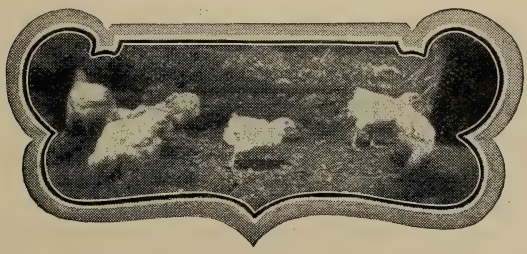
A Chill is Fatal.

Be sure to take every precaution to prevent your chicks

from getting chilled as there is no chance for the life of a chilled chick. Although I am making it appear that there are no end of difficulties I do not wish to discourage anyone, but rather to start him on the right road. To show the other side of the picture I would like to say that last summer I took sixty baby chicks from Sedalia, Missouri, to Des Moines, Iowa, and from there to Lincoln, Nebraska, and then to Pueblo, Colorado, attending all the state fairs at these places, without losing one. These chicks traveled in all about 2,000 miles and spent several weeks in stuffy showrooms and with the exception of three are all living today. Of course, this could not have been done had I not exercised great care looking after them; at the same time it shows the hardiness of the youngsters.

First Weeks the Important Time.

The first few weeks is the most important time in the chickens' lives, the time when their little onstitutions are being built up, as it were, and this is when they require your attention. When your hen was hatching her thirteen eggs you were always prepared for the loss of a few of the chicks; so now, when you are running an incubator and using a brooder, don't be surprised that a few of the chicks die, but just compare the number you lose now with the number you used to lose and see if your percentage of loss is not smaller since you adopted the modern method. I know it is in my own case and I know it will be in yours if you act upon these suggestions.



HATCHING AND REARING ARTIFICIALLY.

Operating the Incubator—Pedigreeing the Eggs and Marking the Chicks—Feeding and Caring for the Youngsters.

By M. L. Spink.

To obtain fine hatching eggs one must raise several generations of breeders which have shown perfect health from the eggs to the breeding pen. These eggs should be as nearly "new laid" as possible, and never over fourteen days old.

We heat our machines for three days, running the lamps very low. When the temperature has registered 103 degrees for twenty-four hours, the eggs are placed in the machines and left untouched for two days. After that, they are turned night and morning by rolling gently to the center of the tray, and we are careful to push the small ends of the eggs slightly down. The eighteenth day, at night, we sprinkle the eggs with water heated to 100 degrees, place the pedigree trays in position and close the machines for good. The eggs usually begin hatching the twentieth morning and are all out about eight hours afterward.

Trap Nests Employed.

We use trap nests and mark the hen's number on the egg she lays. Thus we can tell the hatching quality of each hen's eggs on the seventh and fourteenth days by testing. We keep a season's record of each bird's eggs and at any moment can remedy a fault caused by sterility or dead germs, and we can also record the number of healthy chicks from each bird in the breeding pens.

The twenty-first day we remove the trays, punch the webbs of the pedigreed chicks and leave all chicks in the incubator till the night of the twenty-second day. The brooders have been whitewashed and heated to ninety degrees. We place fifty chicks in a brooder, never more.

By putting them under the hover at night you can control them the first twelve hours. The hover floor has a movable burlap cover, sprinkled with baby chick grit. Their first day is spent making acquaintance with the warmed drinking water and gathering in a supply of grit.

Feed Every Three Hours.

When they are three days old we begin to feed stale bread crumbs soaked in skim milk and squeezed dry. This is scattered on a shingle. We remove hover top and feed

Photograph Illustrating Exterior of the Brooder House Owned and Operated by M. L. Spink.

every three hours allowing about ten minutes for meals. A box of charcoal and chick grit is also placed within reach. The fifth day we furnish only wheat flour moistened with water and made crumbly dry. A piece of sulphate of iron the size of a bean is put in the drinking water. This arrests any tendency to bowel trouble which usually appears from the fifth to the seventh day. The next day we return to the bread, morning and noon, and use chick feed in litter for the other meals. At night oatmeal flakes or cracked corn is fed in troughs made of lath.

At this time they are using the exercise room of the brooder, the floor of which is covered with dry sand and

short cut alfalfa. We mix in the chick feed and it is great fun to see their efforts to scratch. Some topple over, but arise and go at it again. If you teach them the way up to the hover room the first few times, they are capable of keeping warm and happy.

Hovers Discarded April First.

After April first we discard the hover tops and use only the hover room. It prevents them from sweating during warm nights and gives us stronger chicks. The seventh day we begin to furnish them green feed, all the chopped onion or beet that they will eat. The eighth day beef scraps in a hopper is put before them. When the chicks are ten days old we open the brooder and teach them to use the house yard, taking care that they learn the way in.

Three Meals a Day at Three Weeks.

From then on they are quite self-reliant. At three weeks old the meals are cut down to three a day; the heat is down to seventy-five degrees, and they have been weaned from chick feed and are eating wheat, cracked corn and oatmeal. At six weeks of age the birds are placed in colony houses in cool brooders. They have practically free range and are fed by the hopper system, cracked corn, wheat, beef scraps, dry mash, charcoal and grit. One feed a day of whole oats and wheat, soaked, is fed at four P. M., in troughs. Fresh water is carried around each morning.

We clean brooders daily, spray the colony houses once a week and scald the drinking fountains very often. Our birds grow like weeds and we never lose any young stock by sickness after it is six weeks of age. They began laying at five months and eight days this past year, on September seventh, and are still at it. They are bread-winners.

REARING CHICKS IN BROODERS.

A Plain Description of Proved Successful Methods of Brooding and Feeding—Dry Food Makes Healthy Chicks—Separate the Sexes—Causes of Bowel Trouble.

By F. G. Thayer.

The time has come when the hen in her small way is not capable of hatching and brooding the large number of chicks that our markets demand and artificial methods are a necessity. Natural conditions, however, must be followed as much as possible for best results.

The rearing of chicks is the most difficult part of the poultry business. The poultryman's success depends largely upon his ability to increase the flock; if unable to do so he will be gradually forced out of the business. The first few week's life influences to a great extent the value of the future flock. In order to have good mature stock it is necessary that they get a good start. Therefore, your breeding fowls must be in prime of condition; they must be vigorous, healthy, mature and not forced for egg production during winter months. This kind of stock will give fertile eggs with strong germs which will produce vigorous, healthy chicks.

Causes of Mortality.

Some of the causes of mortality in rearing brooded chicks are lack of ventilation, overfeeding, too much or too little heat, lack of exercise, unsanitary conditions, feeding too soon after hatching, lack of vigor in the breeding stock and improper handling of the eggs before and during incubation. Much care is necessary to successfully raise chicks to maturity. Do not force them to leave the brooder too early, as it causes undersized, stunted chicks that may not feather properly. Ventilation is needed at all times and foul air should never be tolerated. It will cause sickness and loss of life.

The time for hatching and rearing of chicks for winter egg production varies according to the breeds used. The heavier breeds should be hatched by May 1st at the latest, and chicks of the Mediterranean class from May 1st to June 1st. Stock so hatched will lay all winter if properly raised, matured, put into good winter quarters and given good care. Late hatched chicks are hard to rear, as they do not mature before cold weather sets in and then their growth is checked. They never make good breeders, as they are born weak and bowel complaints commence early. Late in the season the eggs are weak in fertility and therefore produce weaker chickens. Late hatched chickens are troubled more by lice and diseases and in consequence cost more to raise.

Operating the Brooder.

Before putting chickens into the brooder see that it is thoroughly disinfected and cleaned. Warm the brooder and see that it is at the proper temperature. This temperature should be 95 degrees when the chicks are introduced. Use nothing but the best oil, as it causes less irregularity in the flame and gives better all around satisfaction. The lamp should be filled twice daily. Be sure to keep the burner clean and bright; the wick tube should be kept free from accumulation of crusts.

Trim the wicks twice daily by means of a nail which takes off the burnt material and makes a uniform surface.

The temperature of the brooder should be 95 degrees when the chickens are first put in and gradually reduced to 90 degrees by the end of the first week; at the end of three weeks 85 degrees is sufficient. The first week is the most critical period of the life of the chicks. Trouble is most likely to be caused by chills and overfeeding. In order to have a good early pullet it is necessary that she get a good start. The first few weeks care is responsible to a great extent for her success or failure later on.

Feed, regularity of feeding, cleanliness and plenty of grit and pure water are all important factors in the rearing of chickens. Chicks should be carefully protected from storms and sudden changes of weather, since these, together with low vitality of the parents, are responsible for more deaths than is improper food. Keep the chicks near

the hover the first day so that they will know where to go to get warm.

In two days the chicks may be given the run of the brooder and often can be let out into an outside run. Do not force them to leave the brooder too early as it causes undersized, stunted and featherless chicks.

Feeding the Little Ones.

The mixture I prefer for the first feed is infertile eggs

A Colony House Which May be Used to Accommodate an Indoor Brooder and Flock of Chicks in the Spring and be Used as Quarters for the Growing Chicks Later.

chopped fine and mixed with five parts ofr olled oats, with some green material chopped fine also added. This mixture is fed sparingly for the first few days and then fed more liberally. After a few days, cracked grains may be fed in the chaff where the youngsters must scratch to get it, thus obtaining exercise which develops their bodies, digests their food and wards off diseases, especially diar-

rhoea. Feed little and often and keep their appetites sharp. Keep them hungry; but judgment and practical experience will tell you how to keep them almost satisfied and still a little hungry. They should have access to green material at all times. At night their appetites should be completely satisfied and plenty of feed should therefore be given them.

As they grow older they should be fed a less number of times daily and more at a time. The chopped eggs and rolled oats may be fed twice daily until they are three weeks old and then be displaced by a mixture of bran, middlings, cornmeal, and meat scraps. This can be fed either dry or moist. They grow faster on the moist mash but are more liable to sickness. To make good breeding stock the chickens should never be forced at all as they do not then develop for the best results; one part is developed at the expense of another and that makes them of less value for breeding.

Care of the Growing Chicks.

When the chicks are between five and six weeks old whole grains can be substituted for the cracked grains and their use will cut down the expense. For best results the growing chicks should be fed sparingly in the morning, have either a dry or moist mash at noon and be fed all they will eat at night. The best green foods to be used are lettuce and cabbage and should be fed liberally. After the young ones are four weeks old meat meal should be before them at all times until meat scraps are substituted. They should be given free range as soon as possible as it promotes growth and health at a less expense than on restricted range. Feeding the chicks on dry feeds while young will lessen the mortality. They will not grow so fast but you will raise a larger per cent of your flock to maturity.

Separate the Sexes.

As soon as the sexes can be distinguished they should be separated and those of each sex kept by themselves. The surplus cockerels should be finished off for market and the pullets gradually fed to mature in time for winter laying, but not forced in any way, as that causes weakness in constitution and poor fertility in the eggs in hatching sea-

son. If the pullets show a tendency to lay before you want them to they should be fed a less stimulating ration so as to retard egg production.

Causes of Bowel Trouble.

This is caused by undigested food which acts as an irritant and diarrhoea results. Other causes are too little or too much heat; weak constitution; lack of exercise; impure air or lack of ventilation; careless feeding; impure drinking water; and unsanitary surroundings. Late hatched chickens are more troubled with it than those of earlier hatches. Give them scalded milk and charcoal with a little grated nutmeg.

If weak in their legs give them plenty of exercise and fresh air. This trouble is almost always caused by too heavy feeding or by too concentrated food given the youngsters when they do not have sufficient chance to be active enough to enable their systems to handle it. Chicks on free range are seldom troubled in this way though occasionally some of the cockerels will be affected and then the condition may be caused by overfeeding or by injuries to their backs received from larger and older males.

Grade According to Size.

If the growing chicks are confined in yards, even if the yards are large, they should be separated according to size so that the larger ones will not mistreat the little ones and thus check their growth and development. A half dozen six or seven-pound cockerels will prevent three times as many smaller ones in the same pen from getting as much food as they need and from enjoying the freedom from annoyance that is necessary for proper development. This is not so necessary in the case of pullets, though when trough feeding is practiced the larger ones will always crowd out the smaller.

By hopper feeding this difficulty is avoided, the big ones can go to the hopper and eat what they desire and go away, leaving a chance for the younger ones to satisfy their hunger without fear of being attacked. Hopper feeding also saves at least two-thirds the labor of caring for the flock.

PORTABLE BROODER HOUSE.

A Colony Coop, Costing Ten Dollars to Build, that Will Accommodate a Brooder and Later Serve as a Roosting Coop.

By Ellen A. Day.

A brooder house combining all the good points a person might like is hard to build, unless one has plenty of money. For those needing accommodations for only a few hundred chicks small houses will answer the purpose, and fit a small purse as well.

A structure four feet high in front, two feet high at the back, with the floor six by eight feet, makes a very convenient, portable brooder house. If set on runners it is very easy to move it from one place to another with a team. The roof is built in two sections, is removable, and is fastened down by large gate hooks when in place. It is a great convenience to have the roof off when cleaning the houses, especially when one wants to scrub them out in the spring and have them dry out quickly.

The Brooder House as a Colony House.

When one has finished using the brooders, they can be removed, leaving the chicks in the house. As the roof is low, there should not be many chicks left in each house during hot weather. Doors and windows should have screens fitted in to keep animals out when the doors and windows are left open to admit air. The low houses are much warmer in early spring for the baby chicks. Later on a higher house is much better.

A building, as here described, will cost about ten dollars for material, including window sash for light and roofing paper to cover the roof. Prices will vary in different locations but in building several houses I think they will average about that price.

In our second year using these houses, we cut out the space between door and window and cleated the boards so we could set them back in place when we wished to, in case of storm or cold weather. At other times we had a frame covered with cloth to set in the space. One needs to watch the temperature same as in an outdoor brooder; the houses get very warm when in the sun and closed up tight. We keep doors and windows open most of the time.

This matter of overheating the chicks is often the cause of a lack of thrift and vigor in flocks that are well fed and otherwise well cared for. Often the brooder houses or

Some of the Portable Brooder Houses Described by Ellen A. Day.

roosting coops are closed up so tightly at night that the air becomes very foul inside and before morning the temperature is very high. This not only causes weak chickens but actually causes suffering among them. Our method of fitting screens to the windows and doors enables us to keep the house well open all night so that the chicks obtain plenty of air and at the same time are protected from danger.

Brooder House on Runners.

If the runners are used, they may be made a part of the sills, or the longitudinal sills (those at the front and back) may be made of two-inch planks eight inches wide,

set on edge and allowed to project a few inches at one end. These projecting ends should be rounded up to serve as runners and a cross-piece nailed on from the end of one to the end of the other to which a whiffletree may be attached when it is desired to move the house from one location to another. In this case the transverse sills (those across the ends of the house) should not be more than four inches wide and set on edge between the wider ones making the tops of all sills level. This will make a space of four inches between the transverse sills and the ground so that they will not be in the way when moving the house.

A Colony House in Which the Window is Hung on Hinges to Serve as a Door. This Building May Serve as a Brooder House, as Quarters for Growing Chicks or as a House for a Laying or Breeding Pen.

INCUBATING, BROODING AND FEEDING.

Five Well-Known, Successful Poultrymen Tell the Readers of this Book Where and How They Operate Their Incubators and Brooders and How They Care for and Feed the Future Profit Winners.

Question. In what kind of room do you operate your incubator?

Answers. Mr. Duston: In the cellar of my house. Mr. Dodge: We operate our incubators in a cellar built for the purpose, four and one-half feet below ground and two feet above, covered with a peak roof, the whole covered with two feet of earth. Mr. Ring: In a cellar constructed for the purpose, having cement floor and brick walls. Mr. Langworthy: One in an unused room in my house and another in the dining room. Mr. Lackore: In an empty room without heat, in my dwelling.

Question. How is the room ventilated?

Answers. Mr. Duston: By a bulkhead and three windows. Mr. Dodge: By three ventilators each twelve-inches square, extending through the peak of the roof and by two 3-light sash in the gable at each end of the roof, hinged at the bottom to swing in, also by opening the door. Mr. Ring: By four windows, each one by two feet, five feet above the floor. Mr. Langworthy: By doors and windows. Mr. Lackore: By opening the top sash in the windows.

Question. Do you prefer any other location and why?

Answers. Mr. Duston: Would prefer a well ventilated room above ground in which a fairly even temperature could be maintained. Mr. Dodge: If I build another incubator house I shall make it of hollow cement blocks, and have it entirely above ground to insure absolute dryness and perfect ventilation. Mr. Ring: No. Mr. Langworthy: Yes, a well lighted and ventilated cellar, because the temperature

is more even there. Mr. Lackore: Yes, an especially constructed incubator cellar four feet in the ground with plenty of windows in the south wall and well ventilated.

Question. What temperature do you maintain in the incubator during the three weeks?

Answers. Mr. Duston: 103 degrees, but allow it to run to 105 when the chicks are coming out. Mr. Dodge: First week, 102½, then 103 until the chicks begin hatching, when it will rise to 105. Mr. Ring: 102 to 103 degrees. Mr. Langworthy: First week 102½, second week, 103, third week, 103 to 104. Mr. Lackore: First week, 102, second week, 103, third week, 103 to 104.

Question. Do you supply moisture in the egg chamber?

Answers. Mr. Duston: No, have not found it necessary. Mr. Dodge: Our incubators are the non-moisture, self-ventilating kind, and after five years of use we find them so in every particular. Mr. Ring: No. Mr. Langworthy: No. Mr. Lackore: No.

Question. What are the principal reasons why chicks do not always come out promptly on the twenty-first day?

Answers. Mr. Duston: Weak germs, low temperature and too much airing of the eggs. Mr. Dodge: Low temperature, sometimes due to incorrect thermometer, excessive cooling, varying temperature in the egg chamber, low degree of fertility in the eggs and insufficient ventilation. Mr. Ring: Lack of vitality of germ, drop in temperature during incubation, eggs chilled while being aired. Mr. Langworthy: Running the incubator at too low average temperature. Mr. Lackore: Too low temperature during the hatch.

Question. How long do you keep the chicks in the incubator after the hatch is completed?

Answers. Mr. Duston: Chicks are always taken from the machine on the morning of the 22nd day. Mr. Dodge: About twelve hours. Mr. Ring: Twenty-four hours. Mr. Langworthy: Twenty-four hours. Mr. Lackore: Twenty-four hours.

Question. How do you handle the incubator from the time the hatch is complete until you remove the chicks to the brooder?

Answers. Mr. Dodge: Do not touch the incubators until

I open them to remove the chicks except when there is an extra big hatch, when I open the door a quarter of an inch and fasten it there after the chicks are all hatched and dried. Mr. Ring: Turn down the flame and gradually reduce temperature. Mr. Langworthy: I remove the trays with the shells and unhatched eggs, and leave the regulator and lamp as they were at hatching time. Mr. Lackore: I remove the egg trays and keep the temperature at 100 degrees.

Question. What are your reasons for doing as stated above?

Answers. Mr. Ring: To avoid subjecting the chicks to too great a change of temperature when removing them from incubator to brooder and to lessen the chance of chilling them in their removal. Mr. Langworthy: Taking out the trays gives the chicks more room and gives a chance to put in a little grit and water a short time before taking out the chicks. Mr. Lackore: The chicks are less likely to take cold if perfectly dried and are stronger and better able to stand the changes in temperature which follow their removal. The chicks can be accustomed to a lower temperature more gradually and more easily in the incubator than anywhere else.

Question. Describe the way you move the chicks to the brooder.

Answers. Mr. Duston: In a basket lined with cloth in which they are carefully covered during the removal. Mr. Dodge: In cold weather we move them in a market basket covering them well with a flannel blanket, but in summer they do not need to be so carefully covered, in fact last season we moved 1,800 chicks in an iron coal bucket. Mr. Ring: I put a couple of heated bricks covered with burlap in the bottom of a galvanized iron basket and cover them with another layer of burlap. Mr. Langworthy: We put a warm cloth in a basket or box, place the chicks upon it and fold one end of the cloth over them. Mr. Lackore: I line a box or basket with a warm flannel cloth, put in the chicks and cover them with another warm cloth.

Operating the Brooder.

Question. Do you use indoor or outdoor brooders?

Answers. Mr. Duston: I use nothing but outdoor brooders because I can utilize them indoors as well. Mr. Dodge: We have a large brooder house, capacity 1,000 chicks, heated by hot water and regulated by electricity, which we prefer to indoor or outdoor brooders because it is cheaper to operate and gives the chicks more room under cover in stormy weather. Mr. Ring: Outdoor, so that the chicks can be placed where they can get fresh grass and clover as early as possible. Mr. Langworthy: Inside brooders, because they are more comfortable to take care

An Outdoor Brooder and Brood.

of in bad weather and the protecting house affords the chicks a place to exercise. Mr. Lackore: Indoor brooders in colony houses because they burn less oil and when the chicks leave the brooder they can remain in the colony house.

Question. How warm do you have the brooders when the chicks are put in?

Answers. Mr. Duston: 100 degrees. Mr. Dodge: About 90. Mr. Ring: 90 degrees. Mr. Langworthy: 90 degrees. Mr. Lackore: 98 degrees.

Question. Describe how you handle the chicks during the first 24 hours in the brooder.

Answers. Mr. Duston: I do nothing but keep them warm, give a little water with the chill taken off and a little rolled oats scattered before them. Mr. Dodge: I scatter fine chaff all over the brooder floor, keep the chicks under the hover most of the time, teaching them to seek the warmth whenever they are cold, never allowing them to go far from the hover and giving no food for 36 hours. Mr. Ring: I scatter fine grit in litter and gradually reduce the temperature

A Colony House for Growing Chicks Which Was Constructed Principally From Odds and Ends of Lumber.

to 85 degrees. Mr. Langworthy: Keep the temperature about 90 degrees and feed a good prepared chick food and lots of grit and fresh water. Mr. Lackore: I feed them as soon as I put them in, give them some water with the chill taken off, and see that they go under the hover when they are cold.

The Temperature of the Brooder.

Question. What temperature do you maintain in the

brooder during the first week, the second week, third week, fourth week and thereafter?

Answers. Mr. Duston: 90 to 100 the first week, 85 to 90 the second, about 80 the third and 70 to 80 thereafter. Mr. Dodge: 90 degrees the first week with plenty of ventilation, 85 the second and third weeks and 75 to 80 thereafter. Mr. Ring: 85 the first week, 80 the second and third weeks, 75 the fourth and 70 thereafter. Mr. Langworthy: 90 degrees the first week, 85 the second, 75 to 80 the third, 75 the fourth and after that warm enough so that they appear comfortable. Mr. Lackore: 95 the first week, 90 the second, 85 the third, 80 the fourth and 70 thereafter.

Question. With what material do you cover the floors of the brooders?

Answers. Mr. Duston: Sand because it is clean and easily renewed. Mr. Dodge: Fine chaff with all the long pieces sifted out, because it makes good scratching material, and absorbs all moisture. Mr. Ring: Clover chaff, to keep the floors clean and for chicks to scratch in for their food. Mr. Langworthy: Clover leaves from the hay barn, because I have it, don't have to buy it, because it is all right. Mr. Lackore: Clover chaff which furnishes considerable food for the chicks and is an excellent scratching litter.

Question. How often do you clean the brooders thoroughly and how?

Answers. Mr. Duston: Once a week by removing all material. Mr. Dodge: Once a week the brooders are scrubbed with soap and water and twice a week the litter is removed and fresh put in. Mr. Ring: Every three or four days by removing all litter and replacing it with clean chaff. Mr. Langworthy: Twice a week by scraping out the litter and washing the brooder with hot water containing some good disinfectant. Mr. Lackore: Every other day I clean them thoroughly, scraping the floor with a piece of glass.

Question. How do you disinfect or purify the brooders?

Answers. Mr. Duston: By thorough white-washing between hatches and the use of a good disinfectant in water to disinfect the floors. Mr. Dodge: By the use of plenty of soap and hot water, disinfectants are apt to smother the chicks. Mr. Ring: By keeping them always clean and

spraying them with lice paint after each brood is removed, giving time for the fumes to disappear before placing more chicks in the brooders. Mr. Langworthy: By the use of the hot water and disinfectant mentioned above. Mr. Lackore: Open the brooders and let in the sun which is the best purifier.

Feeding the Chicks.

Question. How soon after the chicks are placed in the brooder do you give them the first food?

Answers. Mr. Duston: They have rolled oats as soon as they will pick them up, or about as soon as they are placed in the brooder. Mr. Dodge: From 24 to 36 hours depending upon what hour of the day they were hatched. Mr. Ring: Forty-eight hours. Mr. Langworthy: I give them a little as soon as they are placed in the brooder. Mr. Lackore: Immediately.

Question. What do you feed the chicks during the first, second, third and fourth week, and after the fourth week?

Answers. Mr. Duston: During the first four weeks, rolled oats, a prepared chick food and occasionally apples and some cut clover, after the fourth week, hard grains. Mr. Dodge: We feed nothing but prepared chick food during the first four weeks, but add a little cooked beef after the first week. Mr. Ring: We feed the first week steel cut oats, milk, grit, charcoal and beef scraps, the second and third weeks a prepared chick food is added, the fourth we also feed ground oats and cracked wheat and after that time, add whole wheat and when large enough whole oats and a mash of cornmeal and bran mixed with milk. Mr. Langworthy: We feed prepared chick food about four weeks and then add cracked wheat and corn, gradually reducing the chick food until it is left out entirely. Mr. Lackore: The first and second weeks, prepared chick food, third and fourth weeks, chick food and beef scraps, after the fourth week wheat, kaffir corn, cracked corn, oats and barley, with plenty of grit and charcoal constantly before them.

Question. How many little chicks do you put in one flock?

Answers. Mr. Duston: Never over fifty. Mr. Dodge: About fifty, never more. Mr. Ring: Forty to fifty. Mr.

Langworthy: About fifty. Mr. Lackore: Not over one hundred, seventy-five is better.

Question. How much run do you give them the first week?

Answers. Mr. Duston: A space about four by five feet in front of the brooder and no more until they are accustomed to finding their way back to the hover. Mr. Dodge: A pen five by ten feet indoors and a yard five by forty outdoors. Mr. Ring: In cold weather they are confined in the brooder; in warm weather they have a covered run three by twelve feet. Mr. Langworthy: In cold weather we keep them in the brooder. Mr. Lackore: A room eight by eight feet.

Question. How much run do you give them the second, third and fourth weeks, and after the fourth week?

Answers. Mr. Duston: They are allowed a pen ten by twelve feet the second week, and the whole of an enclosed run during the next two weeks and unlimited range thereafter. Mr. Dodge: We give them the same room as during the first week until they are placed in colony houses and have free range. Mr. Ring: The same area as the first week until the fourth when it is increased to a space ten by ten feet and after the fourth week they have free range. Mr. Langworthy: The second week a small inclosure in front of the brooder, the third, a room ten by ten feet, the fourth, an outside run ten by twenty-five feet, after the fourth free range. Mr. Lackore: The same as the first week until after the fourth week when they have free range.

What is One Man's Work?

Question. How many chicks can one man hatch and rear with incubators and brooders in one season, hatching during March, April and May, doing all the work himself?

Answers. Mr. Duston: Do not like to state definitely, know one party who raised a thousand chicks for me and the same number for himself besides caring for a flock of a thousand hens, but he was not afraid of work and did not go visiting to any great extent. Mr. Dodge: With proper equipment, about five thousand, devoting his entire time to the work. Mr. Ring: Give it up. I raise from a

thousand to twelve hundred chicks each year, but have assistance. Mr. Langworthy: That depends on the man and the equipment. Mr. Lackore: Two thousand.

Cost of a Four Months' Old Chick.

Question. Figuring eggs at market prices, what is the cost, including labor, of producing a four months' old chick by your method?

Answers. Mr. Duston: Really I cannot tell, it did cost me from nine to eleven cents a pound to produce a roaster, not including fuel, but as I raise stock for breeding purposes now, I have not made a careful estimate recently. Mr. Dodge: As we do not raise chicks for market, we cannot say what the cost would be, but it costs us $1.00 to hatch, raise and keep a Leghorn one year. Mr. Ring: I have no figures to show accurately the cost to this age, my expense for labor is distributed over the entire plant and food, fuel, etc., is charged as a whole to the total number raised to maturity. Mr. Langworthy: Can't tell, we begin selling chicks at one or two weeks old and sell from our flock all the time so that I am unable to tell the cost of producing a four months' specimen. Mr. Lackore: About eighteen cents.

Three Broods of Hen-Hatched Chicks Enjoying Free Range on a Warm Spring Day.

HATCHING AND REARING WITH HENS.

The Writer Firmly Believes in the Natural Methods of Hatching and Rearing Exhibition and Breeding Stock and Tells How the Work Should be Done, from Making the Nest to Separating the Weaned Chicks.

By A. C. Smith.

The art of raising chickens by hens, never well understood, is being fast lost sight of. It is the old method. The few of us who still cling to and advocate the natural method of hatching and rearing are classed as "ultra conservatives" and "has beens," etc. Still I believe in the old hen, and to my mind for the production of nice show specimens of good, hardy breeding stock, she will, nine times out of ten, discount any brooder that was ever built in the hands of ninety-nine out of a hundred men.

The hen is pretty cheap labor and her life services and carcass thrown in can be had for from fifty cents to one dollar and board. She is always on hand, never sleeps through any kind of a calamity, regulates the warmth of the chicks better than any device of man ever has or ever can; is sure to insist on sufficient exercise and when marauders threaten her flock can appear to be the maddest thing on earth, not excepting the proverbial hornet.

This setting hen is complained of as a common nuisance because she will break the eggs, crush the life out of young chicks, will transfer lice from her body to the young, and last, and perhaps the most serious complaint of all, she will lead her youngsters off early in the morning into the wet grass where they become drenched and chilled only to finally droop and die.

All these are just complaints, perhaps, but if one one-hundredth part of the thought and one-one thousandth part of the expense that has been expended in perfecting artificial chicken raisers had been applied to the question

of controlling the natural chicken raiser, these faults would long ago have been overcome. Mother hens do certainly break eggs, even tear nests asunder and bury eggs; they crush young chicks and they lead them into too wet grass fields—but why let them? The trouble is not with the hen, it is with the conditions and surroundings.

The Hen is Satisfactory if Properly Handled.

I once heard a discussion between the agent of an incubator concern and a fancier, who, like myself, is a hard, old-fashioned advocate of the hen as God made her. The latter finally remarked that there was no difficulty in getting good hatches and raising a large percentage of the chicks if the man who set the hen knew as much as the hen. To my mind this comprises the length, the breadth and the depth of the situation as it exists today and as it always existed. Incubators are nothing new, nor are hens. They had both before Pharaoh's time. The hen was the nearest to perfection then and is yet.

This does not mean that there is no use for the incubator and brooder. These machines not only assist the poultry business, but they actually make some branches. Anyone embarking in the business upon a commercial basis must use these machines, but to my mind such an enterprise would be better if the breeding stock was raised by the natural method. To those who are engaged in raising fancy poultry, I unreservedly recommend the hen as we knew her yesterday and know her today.

If we are to use hens, how are we to use them so that they will not break eggs and kill chicks in one way or another? I am glad to briefly outline the method that we have practiced for the past few years an dwhich has averaged us nearly eight good, strong, healthy, sure-to-live chicks out of every thirteen eggs.

There is a great deal in selecting the proper kind of a hen; an ideal hen for a mother will be of a quiet disposition and weigh from five to six pounds. These are taken from the nests in which they have thoroughly developed the propensity to sit, and placed in nests of special design.

Making the Nests.

These nests are made in sets of four. Each nest is

fourteen inches square, inside measurement, and about eight high. It has no bottom except the earth on the floor of the pen in which it is placed. The front consists of a two-inch strip at the bottom and a board eight inches wide hung on hinges. This arrangement makes it possible to fasten the hens on. When there is a sand or board floor, three inches of moist loam should be spread on the floor and this set of nests placed on top of that. This loam should be smoothed off in the nests so that it is just a trifle higher on the outside and in the corners than in the center. This will keep the eggs close together and prevent them from rolling into the corners and getting cold. Rye straw should be placed around the outside of the nest while the middle should be filled with chopped hay or short rowen.

If the hollowing of the earth in the center is just right, it will keep the eggs together, but will not pile one over another so as to crush some of them. Eggs in such a nest are not liable to break as the hens will not have a chance to jump down on them, but must walk in from a floor which is nearly level with the nests.

Eggs with good shells should always be selected. A broken egg is very disastrous to the success of the hatch unless soon discovered and all the besmeared eggs washed in tepid water.

Set Hens That Mean Business.

But to return to the hens themselves. They should be tried two or three days on false eggs. Those that appear wild and intractable should be thrown off and better ones substituted. It is well to have all the hens in each bank of four nests selected from one flock so that they are acquainted. There is then no quarrelling when let off to feed. Good hens having been selected they should sit on worthless eggs for two or three days, when the eggs that they are to hatch should be placed under them.

We have told how to avoid crushed and broken eggs as much as possible. The other main difficulty and one of the essentials to a good hatch is to keep down the lice.

Kill Lice and Mites.

The hens should be dusted thoroughly with some insect or

lice powder when placed upon the nest and, if badly infested, again four days later. A final dusting should be given about four days before the hatching day. Two of these dustings during the sitting period will entirely rid the hen of lice and do much to insure a good hatch, and further, it reduces the liability of head lice on the chicks.

Mites are troublesome pests in hot weather and a few of them will drive the best sitters from the nest. Fortunately kerosene will keep them away if applied to the woodwork of the nest in liberal quantity. This should be done after each hen leaves the nest with her brood, making the nest perfectly mite-proof for the next one. This oil will keep the mites away from the woodwork and the powder will keep them from the nest and hen.

These sitting hens should be fed whole corn, with oyster shell in good supply before them, when they are off the nest. They should be fed every day at a regular hour. Promptness should be the rule. If a set of hens have been fed at 10 a. m. for a few days they are fretful if not fed at that time.

Flatten the Nest When Eggs are Hatching.

As soon as the eggs begin to be picked, the nest should be widened and flattened. The straw should be taken out and the rowen or short hay should be drawn into its place, the idea being to flatten the nest so that the eggs do not rest against each other. This greatly reduces the liability of crushing eggs or chicks. The chicks may stay in the nest from twenty-four to thirty-six hours after hatching.

After hatching the chicks are put into our summer coops. There is a little sand put on the floor of the coops and a very little hay chaff. Clear sand is the first grit for a chicken and it is worth while to see that they get it before they are fed anything. Small chick grit is very necessary from the start.

The First Feed.

The prepared chick feeds have succeeded the old fashioned food of hard boiled eggs and cracker and milk. On the whole it is a good change and nearer nature. These finely cracked seeds keep the chicks running and scratching and picking.

A variety of food is both appetizing and stimulating. The boiled eggs and cracker and milk are excellent for a change and very nourishing, but, as with all soft and cooked foods, they should not be given in sufficient quantity to entirely satisfy the chicks' hunger, as the youngsters then become inactive. The old fashioned oatmeal is a fine food and makes a good change. This may be best fed to the young chicks dry, and as a scratch food. A little later hulled oats makes another good food and change.

Cracked corn and whole wheat may be fed in small proportions when the chicks are two weeks old, but they should not be given a full meal of these hearty grains at first unless both are cracked especially fine.

Feed Little and Often.

The more young chicks are fed the better, provided they are not overfed at any time. The most expert chicken growers feed from five to eight times a day. "Little and often" is the motto of good feeders. Brooder chicks should be fed more often than those raised with hens.

The reason is obvious. The hen will guarantee the chick sufficient exercise, while a brooder chick exercises for his food only in confined runs. The more often it is fed, and the less fed at one time, the greater amount of exercise the chick takes in procuring his food, the assumption being that he is fed in a litter.

Damp Mashes Advisable.

After the chicks get to be a month old or more, it is advisable to give some soft food. The writer likes a mash made of corn meal, flour middlings, in a very small quantity, and acme feed or bran, the proportion being governed by the richness of the ingredients. This should always be mixed with boiling water and allowed to stand and cook. It should be fed warm, but not hot. It should be salted and such ingredients as bone meal, beef scraps and fish meal may be added.

Other combinations are available and make excellent mashes. That known as provender, consisting of ground oats and corn meal is deservedly popular. Chicks like variety in mashes as they do in other things.

The writer believes in mashes, both wet and dry, for grow-

ing chicks. They are fed twice a day after soft feeding is once commenced and as the chicks grow the number is increased to five when they are fully feathered out and are on the range independent of the care of mother hen. At night wheat is usually fed, though cracked corn is given at times for variety.

Dry Mash Sometimes Useful.

It has its advantages like hopper feeding. The food is always there. The smaller and weaker chicks are sure of a good meal when it is wanted. When used in connection with the regular feeding it works well if the wet mash and dry mash are of different constituents and flavor, the chicks eating well of both. When hopper feeding is in practice, two damp mash feeds will take the place of the five, even during the longest days.

Cooping the Chicks.

Fifty chicks and four hens are put into one of our summer coops. These coops are eight feet long, four feet wide, three and one-half feet high in front and two and one-half feet high at the rear. The front is open except for lattice work and inch mesh wire put on over to keep out animals. It is necessary that the hens that are put into such coops be those that have been sitting together. Otherwise they will not get along peaceably.

Separate the Sexes.

The cockerels are separated from the pullets when young. We have two large fields, containing together over forty acres about one-half a mile apart. The pullets are taken to one field and the cockerels to the other. Separating leaves usually twenty to twenty-five pullets or cockerels in a coop. Here they are kept until it is very cold or until snow comes.

SUCCESSFUL HATCHING AND REARING.

Making the Nest and Feeding the Sitting Hen—Operating the Incubator—Handling the Eggs—Brooding and Feeding the Chicks.

By James Shackelton.

There is much that everybody knows which everybody is always telling; there is much that few know and is never or scarcely ever told. So I propose to deal chiefly with these obscure matters.

Not much need be said about natural hatching. The nest should be made right so that eggs tend to be in proper positions, in a close bunch, not tending to fall away from each other. The nest material should not be wet nor of long, stiff straws or hay that will tickle and disturb biddy. And biddy should be taught, even made, to leave the nest once a day to feed. She ought to have water where she can sip it without leaving the nest or even rising from the eggs. Her food is best if rather meagre rations of whole corn or wheat and some grit. It is not wise to give her the usual egg rations, for if she should lay while sitting, she is apt to discontinue sitting. It is best not to give any hen all the eggs she can cover. Fifteen eggs of two ounces each is about the limit reasonable for the biggest hen.

Hens that are not properly fed while sitting become emaciated, their bodily heat is lowered, hatching is made late, or even poor hatches result. Many hens will not of themselves seek food sufficiently often. It is well to make sure that hens are disposed to return to their nests speedily after feeding; an absence of half an hour is the limit at any season and much less in cold weather, if the nest is exposed to the cold. The nest should be comfortable and airy, not draughty, not susceptible of becoming at all as an oven. Consider the hen's comfort. Don't rely on biddy's instinct finding a proper nest. Often a hen does

find an unusually satisfactory nest of her own choosing. Often she will make a nest in long grass just before a bad wet spell that lasts for many days. It is pure folly to trust hens' instincts for anything just because one of them is known to be very smart or very lucky.

Set Only Well-Shaped Eggs.

Never give a hen misshapen eggs unless you have no others. They are quite apt not to hatch good chicks even if strongly fertile. It is well to test eggs under hens, for fertility, after about five or seven days incubation, earlier for white shelled eggs, especially if you have several hens sitting at one time. You can then give all fertile eggs to some of the hens and provide the others with fresh batches.

As to artificial incubation, it is usually best to follow with intelligence the instructions sent out with incubators. But many people seem to think that an incubator can give pure air to eggs when the air of the room is impure, and that is a futile expectation. The incubator should be where the air is pure, where the air is rather moist than very dry, where the temperature varies as little as possible day and night throughout incubation. No incubator always has absolutely even heat in all parts of the egg chamber. To offset that have every egg in every part of the chamber at some time or other, by moving them from center to sides and to ends on a system made certain by marking every egg. Thin-shelled eggs among thick-shelled eggs are likely to dry out too quickly so that they don't hatch. Eggs that show spots all over when held before a light from uneven thickness of shells are subject to the same trouble as thin-shelled eggs. The incubator door should never be opened while hatching is going on. The reason is that when chicks hatch they give off much moisture in drying out and this moisture helps the eggs that have not hatched. When the door is opened this moisture escapes and very frequently the later hatching is totally spoiled by this. Chicks are thus dead in shells for no other reason than that the egg membranes were too dry when the chicks needed to break the shell in order to breathe freely, and the chicks could not break the tough membranes. Consequently the chicks speedily suffocated.

Chicks should not be fed at all until fully seventy-two hours after hatching. They should have water and grit as soon as hatched. If the chicks are with the hens you may let the hens do as they will about first feeding. As a rule, you will find, if you investigate carefully enough, that most hens do not feed chicks until they are three days old. They may run around with them, teach them to pick grit, teach them to drink, but as a rule, they don't teach them to eat until at least three days old.

Feeding the Early Broods.

A chick is not ready to eat food by the mouth until at least three days after hatching. It has enough egg yoke in its intestines to last four or five days. Other food administered before this yoke is digested is just a risk of stagnation in crop or elsewhere, and blood poisoning follows. That ten chicks survive all this while forty die is no reason why one should be subjected to it.

After about ten days of infant treatment, chicks ought to

eat about as adult fowls except that large size grains are not of course suitable for them. But they can eat whole wheat at four weeks, whole corn at eight weeks. Whole oats are scarcely proper for chicks except in small proportions and with plenty of good grit and abundant activity. But hulled oats are the best grain food chicks can eat. Chicks need animal food after first four days of feeding, even if you do not give them animal food, as milk or eggs, before that. Service of animal food to chicks can easily be overdone—is often greatly overdone. Five per cent of total food by weight is enough for a beginning and eight per cent should never be exceeded at any time up to twelve weeks of age, and ten per cent should never be exceeded at any age.

Don't "Coddle" the Chicks.

Chicks should not be kept overwarm, not be coddled at all. Chicks that need coddling are never much good as adults. If they are healthy chicks, well hatched, their apparent need of coddling is your own fault. Chicks should be hardened, gradually, but rapidly. When hardened they are better without much brooder heat.

They will grow well, feather rapidly and well, if you don't coddle them and if you feed them rightly. Chicks should be made to work for the bulk of their food as early as possible, should be taught to scratch for dear life and do that every day of their lives ever after.

Eighty degrees Fahrenheit in the brooder is about what the best chicks need as a starter if they are gradually cooled off from temperature of the incubator during, say three hours. It seems to be unsafe to tell this to most people. I wrote it with the utmost care for Californians a year ago. One man had nearly all his chicks die just because he did not take account of proper precautions plainly told in my directions. Another man who followed my suggestions with intelligence reared every chick hatched. The funny thing was that the man who lost nearly all his chicks was a neighbor of the man who lost none.

REARING CHICKS WITH HENS.

Simple, Successful Methods of Caring for Little Chicks Reared by the Mother Hen—Taking off the Hatch—The Feed for the First Three Weeks—Brood Coops and Where to Place Them—How to Destroy Lice and Mites—Main Features of the Work.

By Geo. D. Holden.

This is a subject ever old, yet ever new; something new regarding it may be learned each season, although the fancier may have had years of experience; but it is the poultryman of little experience rather than the old breeder that this article is intended for.

It is the chicks with the mother hen of which we wish to treat, and as the average fancier raises most of his chicks in this way it is a subject of general interest. We will suppose that the mother hen has been given proper care during the three weeks she has been on the nest and that the chicks may be "supposed" to be free from lice. To be on the safe side each chick should have its head and throat well greased upon being taken from the nest. For this purpose we have found lard mixed with a little carbolineum liquid lice killer to be a fine thing; enough of the liquid to turn the lard a light brown in color. With this mixture grease the top and sides of the head and the throat; this will kill any lice that may have fastened themselves upon the chick, and gives the little fellow a fair chance for his life. When the chicks are to be marked by punching the webs of the feet it should be done at the time of taking them from the nest, not leaving it until they are older with the chance of not being able to identify them again.

Taking off the Hatch.

It should be understood that the chicks should not be taken from the nest until at least thirty-six hours old, at

which time they will be ready for their first feed. When the chicks are all taken from the nest, greased and marked, then give the mother hen a good dusting with some good insect powder before giving the chicks to her again, as it is of great importance that both hen and chicks should be free from lice if the chicks are to make rapid growth and keep in good health and vigor. Most of the ills of chick life may be traced to the ravages of lice and one of the main duties of the fancier in the care of his chicks is to keep them free from these pests.

There are, no doubt, many ideas as to the proper feed for young chicks the first few weeks of their lives; but experience has taught us that the best feed for a young chick is dry feed, small grains, etc., as found in the best of our prepared chick feeds. There are several good brands of this on the market, and we know of nothing that is better for young chicks from their first meal along through the first few weeks of their lives. We have never had a case of bowel trouble in our chicks since using such feed for the first three weeks; the small grains seem to be just the thing for the little fellows and the small amount of animal matter put up in the feed is sufficient for them in that line. After the first three weeks one may begin giving bread soaked in milk, but feeding it as dry as possible by squeezing out the milk and crumbling up the bread. We also begin feeding ground green bone at this period; get the joint bones from your meat market and feed the chicks the best part of it, that is, the most tender and juicy part. A good bone mill will put it in shape so the chicks can eat it without any trouble.

Feed Little and Often.

Feed the chicks a little at a time, but feed often; scatter the feed in chaff, or some good scratching litter to give the little fellows the exercise necessary to develop their strength. Don't over feed; a bunch of young chicks require but little at a time and should not be given enough to stuff their crops, but enough so that it may show in the slight swelling of the crop that indicates a fair meal. When a month or six weeks of age they can be fed more heartily, but in general it is best to be moderate in the amount fed and to feed often. We keep water within their reach from the time of their

first feed. Some people do not give water for a few days, but we believe in giving it from the start.

For the first week or so we keep our chicks in the loft of our barn, in a warm dry place with plenty of light, where they are free from drafts and cold and can scratch in chaff to their hearts content. At the end of the week, or ten days if early in the season, we move them to their outside quarters; we gather them up and place them in a box that has a sliding cover perforated with holes to give ventilation and as soon as all are in the box we give them a good dusting with good insect powder. We also give the mother hen a good dusting before returning the chicks to her; this treatment is necessary in order to keep the chicks rid of lice.

The Coop and its Location.

A brood coop for hen and chicks should be so constructed as to afford ample protection from storms, the hot rays of the summer sun, the destructive rat, skunk or weasel and with a double door at front and back, the inner one of fine wire mesh and the outer one of boards. The outer doors will serve as shelter from rain and sun, and the inner doors when closed down at night will keep out rats, etc. Where coops are located in grass runs the chicks will have plenty of green food, but where the runs are without grass the fancier must provide it for his chicks. For young chicks the grass must be cut up in short lengths and they should have what they will eat at least once a day. Where grass is very scarce, vegetables, chopped fine, will answer; it is simply a matter of keeping as near to nature as possible. Where the chicks have free range, where grass and vegetation is plenty, it requires less attention from the fancier than where the range is devoid of vegetation, as animal life in the way of bugs, insects, worms, etc., is found in greater abundance on good grass land than on land devoid of vegetation and chicks confined to bare runs depend upon their owner for their animal and vegetable food. Brood coops should never be placed in yards in which mature fowls are kept as the old fowls will make life miserable for the chicks and interfere materially with their growth and development.

A fair sized hen will take care of twenty chicks, if not too early in the season, and it is a good plan where several hens are

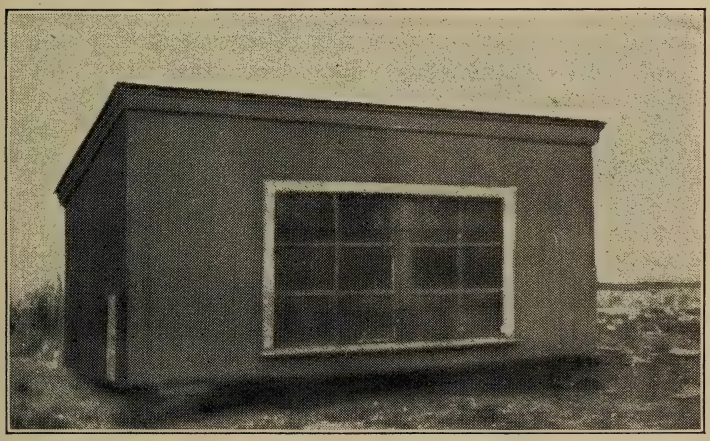
coming off at the same time to use only as many for mothers as are necessary to properly care for the chicks; but where chicks are of different varieties it is best to place some of each kind under the hens that are to be used as mothers, so that they may be accustomed to their color, as otherwise, they are likely to kill those that happen within reach that are different in color from their own; that is, a hen that has all white chicks will not tolerate a black or dark colored chick around, but will kill it if within reach. By giving each hen some of each color, where more than one variety is hatched, trouble will be avoided and the coops in which such hens are confined may be placed quite near each other, and a chick from one entering another by mistake will not be injured, as the hen will not know it from her own.

Separate According to Age.

Do not keep chicks of different ages in the same enclosure if it can be avoided; that is, do not allow those together in which there is a difference of several weeks in age, as the older ones will annoy the younger ones to the extent of retarding their growth. As near as possible keep those of the same age in the same enclosure. From the time the chick is hatched, all along through its days of growth and development, keep it free from lice. Lice kill more chicks each season than any other cause, and they must be fought from the start and kept down if one would secure the best results. After chicks are placed in brood coops it is a good plan to dust both hen and chicks once a week for the first few weeks, then at longer intervals, through the season. To dust the chicks use a good powder blower and when chicks are under the hen raise her carefully and blow the insect powder on the chicks, it may make them blink and snap their eyes, but will not hurt them; to dust the hen thoroughly take her from the coop, place her upon her back with wings outspread, then place a knee on each wing and blow the powder all along her breast and body, then take her in the hand and blow powder in the feathers of the back and neck. This style of treatment of hen and chicks once a week for the first few weeks will pretty well clear up the lice. Do not dust hen and chicks the same day, but about three or four days apart. The dusting of the hen will very often

answer the purpose as the chicks in brooding get their heads and bodies more or less covered with the powder that has been blown on the hen, but to be on the safe side dust both hen and chicks.

Much of the time during April and the first half of May the chicks cannot be out of doors to any great extent, and some sort of an exercising or scratching place is a necessity. The ordinary brood coop will hardly answer the purpose, not being large enough, and our plan has been to con-



A Coop Six Feet Long and Three Feet Wide, With Glass Window in Front, Which Serves as Quarters for Hens With Early Chicks.

struct a coop with the main part three feet by six feet with an addition at each end, twenty inches by twenty-four inches; these end parts to be used for hen and chicks as brooding quarters and the main part as exercising room. The sides of the main part should be on hinges and of the double door pattern, the outer one to be of wood and the inner one of inch mesh wire screen; the wooden door to have a good sized light of glass set in it

When weather is cold or stormy both sides (back and front) of the coop may be closed and this scratching room will be warm and comfortable. In case of wind coming

against one side of this coop, and too strong for the chicks, that side may be closed and the other opened; or, when the weather is nice, both sides may be raised and the chicks have a good shady spot in which to rest. The roof may also be on hinges and thus be a convenience in the feeding of chicks or cleaning of coop. The end apartments, where the hens are confined, may each have a hinged door at the back for convenience in handling the hen, and the opening into the main part should be slatted so that chicks may pass through into the main part, but hens cannot. The roofs of both main part and addition should be of the shed-roof pattern. Such a coop will answer for two hens and forty chicks and the chicks may be kept there until time to change them to fall or winter quarters.

A coop for a single hen and twenty chicks could be made with main part one-half the size of the double coop, but the latter coop will be cheaper to construct in proportion to its size and will save time in the care of the chicks. By setting four or five hens at the same time the chicks may be given to two hens and in such a coop they will be comfortable in all kinds of weather. In cold or stormy weather it can be closed tight enough to keep the chicks warm, and in warm weather can be opened so as to allow plenty of ventilation and shade.

Protection From Rats, Etc.

It will be seen that the ordinary brood coop, one large enough for hen and chicks for night use, when the chicks are brooded, is not sufficient for the comfort of the chicks during such times as they cannot run outside because of storms or severe weather. Some shelter should be provided that will admit of exercise beyond that possible in ordinary brood coops and whatever plan may be followed, whether along the line of the coop we have mentioned or some other line, it must protect from heat and cold, allow of ample ventilation in warm weather, and be a protection from the ravages of rats, cats, etc. If left so that rats can get in at night, the time when they do the most damage, then in some localities it would be a hard matter to hatch enough chicks from the average sized flock to keep the rats busy disposing of them; an ordinary, strenuous rat will get

away with from ten to fifty in one night, and he is not in the least careful to take just the poorer specimens, but takes the most promising ones as well. Thoroughbred chicks are rather expensive feed for rats or lice, and the best plan is to keep the chick premises rid of both. A good cat, that has not developed a taste for young chick meat, makes about the most satisfactory rat trap that we have ever used. We have one that makes it her business to inspect every chick coop on the place at least once a day and rats and mice are scarce indeed; yet, with such a good protection against rats we still make our chick quarters rat-proof. It is best to be on the safe side and take all possible precautions.

When the chicks reach broiler age and from that time on they should be looked over carefully and those specimens that have disqualifying defects, or show that they will never be of more than ordinary quality, should be culled out. The ordinary specimens may be given longer time to show quality if the fancier is doubtful, but the culling process should be thorough, gradually weeding out all specimens that do not show a reasonable degree of quality. Most fanciers are not blessed with an abundance of room and are inclined to hatch more chicks than they have space to raise to maturity. The only thing to do is to cull out the poor specimens as soon as their age is sufficient to indicate their probable quality at maturity; by close culling room is made for those specimens that indicate good quality and the fancier is able to go into winter quarters with a well balanced flock in a well-matured condition.

Discard the Weak Chicks.

In the American varieties, where size cuts some figure, it does not pay to bother with those chicks that do not seem to grow, that is, do not keep pace with those of average size in the flock. They have the same chance as the others, but seem stunted, and generally are so. The best thing is to put them out of the way as soon as it is seen that they are lacking in vitality and very likely will always be under size.

The mother hen should receive good care as well as the chicks so that she may be in good health and condition while with chicks; a hen that is somewhat out of condition

is not a fit mother as her poor conditon will soon affect the chicks and their growth will not be what it should.

If at any time chicks appear dumpish and do not seem to have much appetite, you may be certain something is wrong, and in the majority of cases it will be found that they are troubled with lice. As we have said, lice are the prime cause of most of the ills of chickhood and it is only by constant care and watchfulness that the chicks may be kept free of them.

Don't for a moment think that because chicks are well treated for lice when taken from the nest the one treatment will do for the entire season; it possibly may, but the chances are that others will be necessary. It is best to put them through the dusting treatment at regular intervals for the first six weeks of their lives; after that at longer intervals.

The Main Points to be Considered.

If one were to condense a chapter on the care of chicks raised by hens to a few sentences it might be well covered by the following: Set eggs from healthy, well-mated stock; use as sitters females that are quiet and gentle and in good health; keep hen and chicks free from lice; provide a varied and wholesome bill of fare; provide comfortable, healthful quarters and keep them clean. That is about the whole thing in a "nut shell," and it must not be supposed that the raising of chicks successfully is such a very difficult undertaking, requiring elaborate paraphernalia, a big stock of poultry remedies and much scientific knowledge. The main point is to keep them healthy and keep them growing; do this in the simplest way possible and your way will be a good one.

Coops must be constructed to meet the demands of comfort for all kinds of weather; the style of the coop is immaterial so long as it fills the bill and does the work. The same is true regarding the feed; if any one has found by experience a line of feed that does the work satisfactorily then stick to it. Any method of treating for lice that does the work should be followed out each season. The aim should be to work out, in each case, the most simple and effective plan, for it must be effective to be successful.

Coops should be made as durable as possible so as to be used several seasons; it will be a saving of time and expense to build them in this way for a temporary affair seldom gives good satisfaction.

A Work of Pleasure and Profit.

The care of chicks may be a task to some, but to the genuine fancier it is a pleasure. It gives him an opportunity to watch their development from shell to maturity and to store up knowledge concerning the development of color in plumage, etc. He can use this knowledge to good advantage in his work of mating next season; in fact, it is only by a careful study of chick life and its development that a real knowledge may be obtained of the tendencies and development of color of plumage, and the care of the chicks throughout the season gives the best possible opportunity for such study. As we have said, it is a source of pleasure to the real fancier rather than a task.

Vigorous, Free Range Young Stock and Part of the Straw House Which Will Serve as Their Winter Quarters.

SUMMER CARE OF YOUNG STOCK.

Roomy Coops, Good Food, Freedom from Lice, Sufficient Shade Make Healthy, Profitable Chicks.

By C. A. Dutton.

The "danger period" which causes the poultry raiser so much anxiety for the first six or eight weeks of the chick's life is past. The young stock now has more strength and vitality and is not so subject to "set backs," caused by change of feed, exposure, and other things. The important thought from now on is to care for and properly feed the young stock to enhance its steady growth and perfect development.

One of the things to guard against especially, as the summer advances and the nights become hot, is overcrowding in the roosting or brood coops.

A brood coop three feet square may comfortably hold thirty-five or forty chicks up to three weeks old, but they very soon double in size and require twice the amount of room to be comfortable.

Crowding is Dangerous to Health.

A sign of overcrowding and overheating at night is droopy wings and a lack of that sprightly action and growthy, healthy appearance, that are seen in properly cooped chicks. And, again, a coopful of chicks is a veritable hot bed for lice. These pests are ever present and unless measures are taken against them constantly they will gain a foot-hold. There is so much said and written about fighting lice that it may sound like a chestnut to some as it did to the writer in times past. But a few costly experiences with lice will teach most of us that they are the worst enemy of the poultry industry, and should be unceasingly besieged.

I try to protect chicks from lice by a thorough dusting of the mother hens, before and after hatching. I use a baking powder can with holes punched in the cover which makes a handy and economic powder box. But quite often lice

will be found on the young chicks even with this method, and the only thing to do then is to catch them and with a machine oil can drop sweet oil on their heads and under their throats.

If chicks are four or five weeks old, lice may be found in the fluff feathers. Lice will leave the head as soon as these feathers start and a little lice powder sifted into the plumage here will kill them all.

The coops used on our farm will comfortably shelter twenty-five to thirty four-month-old chicks. They are light and easily moved from place to place.

A very essential factor in the care of young stock is the feed.

After chicks are two months old they will live on most any feed. But the breeder who is raising poultry for breeding and exhibition must give the feed question more than passing notice.

A Satisfactory Method of Feeding.

There are so many different methods of feeding, many of which are good, that I shall not attempt to argue which is best, but will give my way of feeding which gives me most satisfying results. For a whole grain ration I feed equal parts wheat and millet seed morning and evening until chicks are three months old. At noon I feed a dry mash made of one part cornmeal, two parts ground oats and one part bran, by measure. To this mixture is added from fifteen to twenty per cent of beef scraps. This is fed dry in feed troughs. It is surprising how soon they will learn to eat this feed and nothing is left but a few oat hulls.

When chicks are about three months old the millet seed is replaced with whole oats. Oats is one of the very best feeds for chickens, old and young.

When the chicks are about five months old I begin to teach them to roost in the main house. Brown Leghorn chicks at this age will take to the trees, unless taught to roost elsewhere. The brood coops are located near the main house and by coaxing the chicks into the main yards with feed, I can soon teach them to roost in the main house. This saves a lot of work in the fall. One will realize this after he has climbed round in tree tops on a frosty moonlight night

in the late fall trying to catch some scarey Brown Leghorn pullets. They are always timid when approached on their tree-top perch and it may be a week before all of them are caught.

Shade is Necessary.

I nearly forgot to speak about shade. Chicks can stand very hot weather if they are not exposed to the direct rays of the sun. A large maple grove on our farm furnishes plenty of shade, but where natural shade is not available cheap pole sheds with green hay thrown on will provide artificial shade and be much enjoyed by the little ones. Another very important factor, in the care of young stock as well as old, is regularity in feeding and all detail work. This is an established fact in other branches of the live stock industry and none the less true of the poultry business. In closing I may say that the subject of caring for chicks in summer may be simmered down to this—roomy roosting coops kept clean; sound grain, whether fed whole or ground; never allow peace to reign between you and lice; keep water in a shady place and grit near by; and last, be regular in feeding and in all other details.

CARE OF THE GROWING CHICKS.

Four Well-Known, Successful Breeders of Standard-Bred Fowls Tell Briefly How They House, Feed and Care for the Chicks to Secure the Fastest and Best Growth and Development During the Summer Months.

Oats is One of the Best Feeds for Growing Chicks.

By C. M. Renne.

Summer is the season of the year when all the fanciers and poultrymen are interested in the methods which will promote the best growth in the chicks. Having been unusually fortunate in rearing the chicks placed in brooders, I have been tempted to write on how I feed and care for my White Plymouth Rocks.

My chicks are hatched in incubators and reared in outdoor brooders. They remain in the brooders until they are nearly or quite feathered out, say six or seven weeks, with a larger run as they get older. Then they are removed to colony coops made of dry goods boxes. I do not place more than twenty-five in each coop and put them out near a corn field or meadow where they have free range and find all the bugs and grasshoppers they can eat. When they are five or six weeks old I begin feeding whole wheat, cracked corn, and oats. Oats I find to be one of the best feeds for growing chicks, in fact I feed them the year around to my whole flock and have always had very satisfactory results. Let me urge the reader never to try to save by buying tainted or poor chicken feed, especially for young chicks, as it is sure road to disaster. I also keep sour milk before my chicks at all times and you can find nothing that will promote a faster or better growth. They may remain in the colony coops until cold weather when I place them in their winter quarters.

Be sure that everything is kept scrupulously clean, drink-

ing fountains, coops and brooders, and I am sure you will vote with me that the chicken business is profitable and pleasant. Success to you all is my wish.

Keep the Growing Chicks in Small Flocks and Give Them Plenty of Room and Food.

By E. C. Willard.

We have noticed that many who succeed in bringing chickens through the first few weeks of their lives do not get them to grow fast and develop quickly afterwards, and we think an outline of the methods which have proved quite successful here may be helpful to others.

When the chickens are taken from the brooders, or as soon after as is convenient, the sexes should be separated. We put those intended for market in small yards and feed fine cracked wheat, fine cracked corn, sifted, and beef scraps. Chickens intended for breeders and layers are put in lots of twenty in small houses located in large yards, where there is plenty of shade and grass, clover, oats or rye.

We feed in hoppers, a mixture of two-thirds cracked corn and one-half wheat in one hopper, or compartment, and grit, charcoal, bran and beef scraps, mixed in equal measures, or beef scraps alone in another. As soon as the chicks will eat them we mix oats with the wheat and corn. We use galvanized drinking fountains of the inverted flower pot pattern. We fill them when necessary, rinsing each time and washing with hot water often.

We prefer to keep our flocks in small houses and large yards with ample range rather than confined in small yards. The small houses are easily removed and the chickens do not crowd when only twenty are in a coop. Our small houses are made of box lumber and are about three feet by six feet on the ground, three feet high in front and two feet behind. The ends, back, roof, floor and two feet of the front are made of matched boards; a space one foot wide at the top of the front is covered with one-inch mesh netting. A door two feet wide is placed in the center of the front. Along the top of the front is a one-inch board, twelve inches wide, hinged to the roof. This is supported by a wire and pre-

vents both rain and sun from beating into the interior. It can also be turned back upon the roof, or allowed to hang down and close the opening in very bad weather.

The stock is kept in these houses until it goes into winter quarters. We have a few large colony houses about six feet by ten feet built for individual brooders. They have floors and the sills are rounded up at the ends so that they can be hauled about. The last broods of pullets are kept in these until late fall and sometimes all winter.

By cooping growing chickens in small colonies, preventing crowding, giving practically free range, abundant shade, good food and fresh water at all times, we can produce strong vigorous chickens. And we find that by furnishing everything in ample proportions, cooping in the open, airy houses and bringing them to an early and natural maturity we produce pullets which will stand cold and changeable weather well and give us a good winter egg yield.

A Lighted Lantern for Warmth, Dry Grains for Food and Piano Boxes for Coops.

By P. F. Tassie.

My method of caring for the chicks after leaving the brooder, is as follows:

Coops are arranged in the yard with the fronts facing east and a run attached. The reason for facing east is that they get the early morning sunlight, and it is warm for them, and during the afternoon they are more or less protected from too much heat by the shade of the coops; this is essential where one has to supply artificial shade.

The chicks are kept in the runs for a few days until they become accustomed to their new home, and are later given their freedom. In order to protect them against sudden storms catching them in the open they are occasionally called in and given a small feed of grain on the inside of the coops to insure their finding their way in should a storm arise. This has been of great advantage during the past month or so.

Should the day or night be cold a lighted brooder lamp is placed in the coop, or if you have not a brooder lamp a com-

mon stable lantern will answer the purpose, and this also allows them to warm up whenever they come in from outdoors. And let me say, this question of heat is one of the greatest factors in the growth of the chicks. Keep them reasonably warm at all times. Warm chicks will not crowd or smother, and the benefit will be seen in their development.

These coops are kept bedded deep with straw and the chicks sleep on the floor, not having any roosts.

The feed consists principally of dry grains. At first they are fed chick food and as soon as they are able to take larger

Separate Colony Houses and Yards for Growing Cockerels and Pullets.

grains they are given wheat, barley, and cracked oats, together with some cracked corn; these grains are their main feed, more especially the oats and barley. About four times a week they are given beef scraps, bone meal and charcoal, together with good sharp grit. The water fountains are all of galvanized iron, and are filled three times a day with good cold water, and are covered with a shelter of boards to shade them from the sun.

Every morning they are given some lawn clippings, consisting of clover, timothy and blue grass, in addition to what they can pick up through the day. A separate yard is kept seeded to alfalfa or other crops and they are turned into this at intervals.

As soon as the cockerels become troublesome they are removed and given special care so as to develop into large, vigorous birds. The pullets are allowed to grow without forcing of any particular kind as I believe the best growth to fit them for the show room, and to obtain good, fertile eggs is a natural growth rather than one to force them to lay at the earliest moment.

A sharp lookout is kept for lice at all times, and twice a week the chicks are given a dusting with lice powder.

I aim at all times to keep the chicks moving, for a moving chick is a growing one and a growing chick is a healthy chick. The birds are turned into their winter quarters as soon as the weather turns cold in the fall.

Piano boxes turned over on their backs will make good coops for chicks, so that when it is raining they still have a place to scratch in, and at the same time keep dry.

Free Range on Green Grass is a Decided Advantage—Separate the Sexes.

By John Kruse.

How do I obtain my best results with my chicks from the time I transfer them to the open colony houses from the brooder? Usually I follow out one system, or practically one system, of caring for them from year to year, but I find I progress along slightly varying lines as conditions vary according to surroundings and climatic conditions. It is difficult to acquaint others with your theory, though it may be simple, and make them understand it as you do; many fanciers have an entirely different way of feeding and caring for young and growing poultry and yet succeed fully as well. My system might prove faulty in their surroundings, but with it I succeed admirably.

I have accomplished the most with my incubator chicks in this way: I take them from the nursery brooder when

three weeks old, then if weather is cold and damp, as we all find our Minnesota weather in March and April, I transfer them to another brooder where the artificial heat is about forty degrees and where the hover compartment is sufficiently high so that the chicks can stand up without their heads touching the top. In the month of May I can usually shift them from the baby nursery, when three weeks old, right into good tight colony houses and keep them there until the chicks are too large for them.

Attractive and Successful Colony Houses for Growing Chicks.

I start all my young chicks on rolled dry bread crumbs and oatmeal, then introduce and use prepared chick foods until chicks are old enough to eat wheat, kaffir corn and millet, and, perhaps, once a week, cracked corn. Corn is too fattening to feed often and I believe in building frame first. I feed only twice a day after the chicks are three or four weeks old though they always go to roost with full crops. Our chicks have good grass runs, plenty of shade, good fresh water and free access to grit, charcoal, oyster shell, bran and beef scraps.

As soon as the sexes are distinguishable I separate them as they always do better separate and then frequently vary the grains fed.

THE PRACTICE OF DRY FEEDING.

A Well-Known Poultryman Explains the Advantages of This System for Growing Stock—Dry Food in Hoppers Preferred to Damp Mashes Fed at Regular Intervals—Its Influence Upon Early and Continuous Laying.

By P. R. Park.

Chickens are easy to get. Simply a nice lot of eggs and an up-to-date incubator allowed to do its work three weeks, and there you are—or rather, there the chicks are.

Each chicken represents an opportunity, recognized by the skillful poultryman as a next season's egg producer, a fat, juicy roasting chicken, or the head of a pen of breeding stock.

As to their development much depends upon their feeding. If we simply want to raise a few of them to maturity, all well and good, but if we wish to give each one a chance to develop to the best advantage, and equal or excel either parent, we must nourish this young "opportunity" to the best of our ability and in so doing we shall make a distinct gain.

Chickens are about one-half bone, muscle and feather; the balance appetites, and the larger this appetite is trained to become, the more quickly we get the results sought.

Your show bred Berkshire represents man's careful manipulation of a hog's appetite, and we have today an animal with generations behind it of carefully developed digestive systems that will reduce a bushel of corn into the greatest number of pounds of pork with less than one-half the food waste of the razor-back from which it sprung.

We should go through the same evolution with our poultry. Starting with the newly hatched chick we should so carefully feed that we shall have a bird at maturity capable of reproducing itself with greater vigor and with more

economical digestion—in fact, we must feed to improve the stamina in our flock and to develop them along the line of the Berkshire—the maximum amount of gain with the minimum amount of waste.

Follow Nature's Suggestions.

To accomplish this we must solicit Dame Nature's help, for we must first of all follow her line or our craft is shipwrecked before we are out of the harbor. Note how she adapts her children to the surroundings. For instance, put your broad flanked, deep bodied, heavy Holstein into the hilly pasture where feed is short and within a few generations you will find in their places cattle of one-half the size, and thin, pinched figures and a general half-starved hustle-for-a-living appearance.

On the other hand, take the thin, "slim waisted" cattle from a hill pasture owner who makes his feed "hold out" and place them for a few generations upon the meadows of our "down the valley" cousin. This man has feed to sell. Soon we have developed a type with broad muzzle, deep flank, wide buttocks, every line betokening full feeding of rich, nourishing food for generations.

Take the chickens of a liberal feeder at the age of three weeks. They will have strong, thick legs, wide feet and long bodies, very few feathers if of the larger breeds, in fact their wings will hardly have started to grow; while if we look at the youngsters of one of the scant feeders, we find short bodied chicks with a general pinched air, looking as though they were hardly sure they ever had a full meal or ever expected one.

Take the chicks at this age and give them to the best feeder in the world, and he can never make them as thrifty or equal to the first lot. The "opportunity" was there, but it was not grasped during those few short weeks and Dame Nature has decreed that as the chick is to be brought up on short rations she must cut the garment from what cloth is given her.

For this reason we must be sure that we are started right and then push and push hard; no experimenting, but liberal feeding of the right kind of feed. With plenty of fresh air at a proper temperature and with sanitary surroundings,

we have our system started on the right, broad gauge road.

But they will take on the pinched appearance at short notice if the proper feed conditions are not forthcoming, and right here is where multitudes "fall down." They start the chick along in nice shape and after the first interest wanes, or other work presses, the chickens are fed when they think of it, with whatever comes handy, and then they wonder why their pullets do not lay as early as their neighbor's across the street and that the cockerels are lean, lank, thin fellows when they should be fat and bringing good prices. Again they have let an "opportunity" slip past them.

The pullets from our "hit or miss" feeder, after being placed in winter quarters and liberally fed, will start laying in time, but they must get a comfortable layer of fat over them before they join the ranks of producers. This wastes valuable time and when eggs are high it seems to take longer. If the same feed had been added to the growing ration they would have come to laying from one to two months earlier, and, in the case of the cockerels, have gone to market at least six weeks sooner and at much better prices. Look which way we may, we can find no excuse for scanty feeding unless you wish to work off some sour, musty stuff on your birds and by keeping them half starved get them to eat it and exist (we cannot say "thrive") in a half-hearted way.

Hopper Feeding for Results.

The point to be decided is how we shall feed to get the results we are seeking. We certainly cannot mash-feed young chicks liberally without trouble of a serious nature right away, and if we find it best to dry-feed these babies, why not the three weeks' old fellows that are building their frames for the land of plenty that their early training has taught them to expect? Here is where the golden moments are slipping by; we must not let them want at this crucial point and how can we be sure that they are not in want unless we keep a full supply of wholesome food in a palatable form within reach at all times? Fifty chicks

with a hopper or dish of proper feed within reach will always be full fed and cannot lose a moment's time.

Perhaps your eight weeks old chickens have reached the uninteresting stage or the period of press of other work; they are building fast and are every day requiring more feed of the most nourishing kind. How can we supply them with as little labor as by using liberal sized food hoppers full at all times?

Just add a supply of water and right kind of sleeping accommodations, and you have chickens in the seventh heaven; while if fed upon mash, there is a nerve racking, "survival of the fittest" rush at every feed time to get what they may, and long, anxious hunts between meals. How can we expect to fatten a lot of cockerels that are quarrelsome enough when full fed, but are veritable cannibals when fed on "streak of fat and streak of lean" basis? We want to get those quarrelsome fellows off our hands as early as possible. First, because they are softer and bring better prices; second, because when hard, it takes nearly twice the feed to produce a pound of gain; third, because the price during the fall months is steadily falling; fourth, the sooner they are out of the way, the more room we have for the pullets.

If possible, before they begin to crow, put them in a large grass yard out of sight of pullets or hens. Give them a hopper of ground, rich food of a fattening nature, and coax them to fill up at night with cracked or whole corn, with milk to drink if you have it, and we will stake our reputation that you will never return to the moist system of feeding.

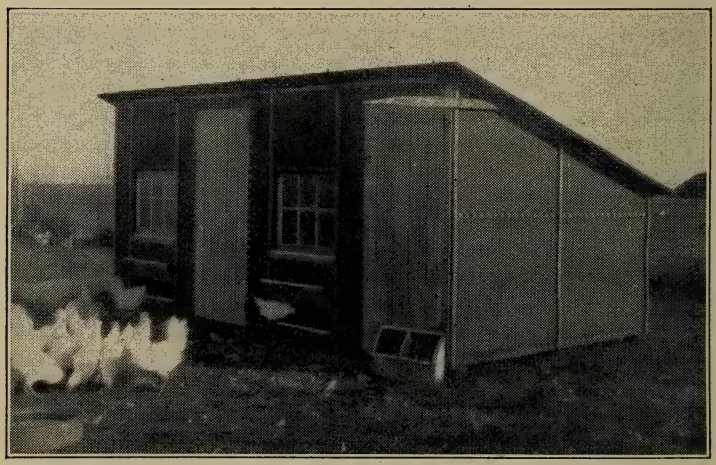
Better Feeding for Less Expense.

With our pullets grown to maturity upon a range and fed with a slightly modified ration so they go to the laying houses in good plump condition starting at once upon a rich, highly nutritious mash in the hoppers, so blended that they have no tendency to get over-fat, and with a good mixture of grain thrown to them in litter once per day, have we not solved most of the labor problems of poultry keeping for the one man plant or the ten man outfit?

Here we have hoppers so arranged that they will feed the flock all day long for a week at a time without replenishing.

The eggs must be collected, the hard grain fed and the birds must have their water, but this can all be done at one trip with horse and cart nine months of the year. During the balance of the season it will be necessary to make an extra watering trip in the morning, but fortunately this extra work comes when other work is not pressing.

If you are working a plant alone, how many more birds can you care for on this system? If you are hiring labor, does it not appeal to you that the birds will be cared for in better shape with less high priced labor? If you are in it for pleasure alone, will you not get more enjoyment out of it if you do not have all the drudgery of the old system to contend with?



A Colony House Which is Placed on the Range to Accommodate Hopper Fed Young Stock at the Minnesota Northwest Experiment Farm.

THE BROILER BUSINESS.

Broiler Raising Seldom Proves Profitable as an Exclusive Business, but May Be a Source of Considerable Income as a Part of the General Business of Poultry Keeping.

By H. A. Nourse.

There are two kinds of broilers. The smaller are known as "squab" broilers and are very small chicks, weighing from one-half to three-fourths of a pound each. The demand for these is not very great as yet so that their production forms but a small part of the broiler business. The average broiler weighs from a pound to two pounds and sells for from twenty-five cents to one dollar according to the season of the year and the purchaser. The early spring broiler is sold for the highest price; fifty, sixty and occasionally seventy-five cents per pound is received for especially nice specimens in the latter part of April and fore part of May. During June the price falls rapidly and at the end of July the price in the open market frequently falls to twelve or fifteen cents a pound for very nice broilers.

It is apparent that if the chicks can be successfully hatched, reared and marketed in the time of highest prices, the profit is considerable and successful broiler raisers who have the stock ready when the price is up, make the short season a very profitable one. In years past this fact has induced many people to go into the broiler business who knew practically nothing of the work and who invested their money freely and lost the greater part of it. Many large plants have been built with the intention of hatching, rearing and marketing these little chickens twelve months in the year and while a few of them have been successful, the majority of them have not. In fact, very few plants which have to depend upon the production and sale of broilers for their entire revenue have existed long and those few have, as a rule, enjoyed the advantage of an exception-

ally good local market. The fact of so many failures in this business does not by any means indicate that there is not money in broilers, but it does seem to prove that as a separate industry this branch of the poultry business is successful in but few cases, under especially favorable conditions only. Handled as a branch of the general business of poultry farming or in connection with some other pursuit which allows the operator to give his chickens considerable time in the late winter and early spring, the production of broilers is decidedly profitable if correctly conducted.

Broilers as a Side Issue.

The egg farmer finds it necessary to do a certain amount of business in broilers in order to rid the plant of the surplus cockerels before they become a nuisance; the farmer who maintains a flock of one hundred or more layers and the village poultry keeper who winters his two dozen egg producers may follow the same plan with advantage though of course they would not have sufficient birds to make what would be called a "broiler business."

On the combination poultry farms where the business of producing exhibition birds, eggs for market and poultry for food is carried on, and on the strictly utility farms, where

An Open Front Shed Which Shelters Outdoor Brooders on a Successful Broiler Plant.

Colony Houses Where Broilers are Fattened on a Well-Known Poultry Farm.

eggs and poultry for market are the mainstay, most of the broilers are produced. On these places incubator cellars, containing a greater or less number of large incubators, and brooder houses, some of them several hundred feet long and equipped with hot water heating apparatus for heating both houses and brooders, form the main part of the equipment. The incubators are put in operation in the latter part of January or early in February so that the first lot of future broilers go into the brooder house about the first of March. The hatching of broiler chicks is continued on most of these plants until the first of May when the last broods are taken from the machines. A broiler weighing one and one-half pounds requires an average of ten weeks in which to grow, the last two weeks of which is given to laying on flesh and fat; therefore, the chicks hatched before the first of March are ready for market about May 1st when the prices are highest and those which leave the shell about the first of May are placed on the market in the middle of July just before the prices tumble.

Rearing the Broilers.

The methods of hatching and rearing of these chicks are

not different from the hatching and rearing of chickens intended for any other purpose, except that less attention is paid to building vigorous constitutions. The idea is to grow them as quickly as possible, covering their light frames with as much meat and fat as may be. Since the muscular structure must be tender no more exercise is given them than is required to maintain their appetites.

Milk and beef scraps form a part of their diet almost from the first and during the last two weeks of their lives beef scraps, oats, barley, corn and milk make the greater part of their food, most of which is given them in the form of a damp mash mixed with the milk. Various rations are recommended for fattening the youngsters, most of which are satisfactory under fairly favorable conditions. A ration which has proved satisfactory in the writer's experience consists of three parts cornmeal, one part bran, one part oatmeal (with the hulls sifted out) and one part high grade beef scraps, mixed with milk.

This ration, however, must not be fed more than three times per day, and if fed to any but strong, vigorous chicks, it will soon put them "off their feet" as poultrymen say. If the chicks are not able to stand this ration and make good use of it, the amount of bran and oatmeal should be increased half a part each. This ration will make yellow flesh and yellow fat. If white flesh is desired a ration composed of equal parts of cornmeal, ground buckwheat, oatmeal with the hulls sifted out, mixed with milk, will prove satisfactory. Some fatteners, however, prefer to replace the ground buckwheat with barley meal.

Broilers are Pen Fattened.

Broilers are always fattened in pens and at least one feed per day should consist of whole or cracked grain such as wheat or cracked corn, for the hard grain assists to keep the digestive organs in condition and also provides exercise if scattered in a litter for the chicks to scratch for. Plenty of grit and granulated charcoal should be constantly in reach of the chickens as both are required for good digestion.

Broilers should always be picked dry and, unless prepared for a special retail market, should be forwarded undrawn and with heads on.

FATTENING THE COCKERELS.

The Advantages of Properly Fattening the Surplus Cockerels —Why Some Fatten More Readily Than Others—Care of the Cockerels During the Process—The Best Food for the Purpose—Marketing the Fattened Specimens.

By H. A. Nourse.

In spite of the fact that editors and contributors are constantly urging breeders of poultry to market their surplus cockerels early in the season, it is true that by far the greater number are sent to market in October, November and December. In some cases it is necessary to delay this work until the season is well advanced. The breeder of fancy poultry can do no more towards culling his flock than to remove specimens that are disqualified for malformation until the youngsters have become nearly mature, or at least well grown. He must therefore market such of the cockerels as he would not sell for exhibiting or breeding well toward the end of the season. More than three-quarters of the young stock that is shipped to market goes forward in thin to medium flesh and has to be offered at low prices. On this account it happens that the poultryman who carefully fattens his birds and ships them to market in excellent condition secures premium prices. That it pays to give some attention to this fattening business is obvious. For example, suppose we have ten cockerels running about the place which are in the condition of flesh ordinarily found when the usual care and food is given. These cockerels will weigh, when prepared for market, perhaps five pounds each and command, we will say, 12 cents per pound, or $6.00 for the ten birds. If these cockerels are properly fattened they can be placed upon the market weighing seven pounds each, and in the same market should command 15 cents per pound, making the lot worth $10.50. This gives a profit of $4.50 to pay for the

fattening process, which is scarcely more expensive for food and labor than the ordinary food and care of the birds

Some Cockerels Fatten Better Than Others.

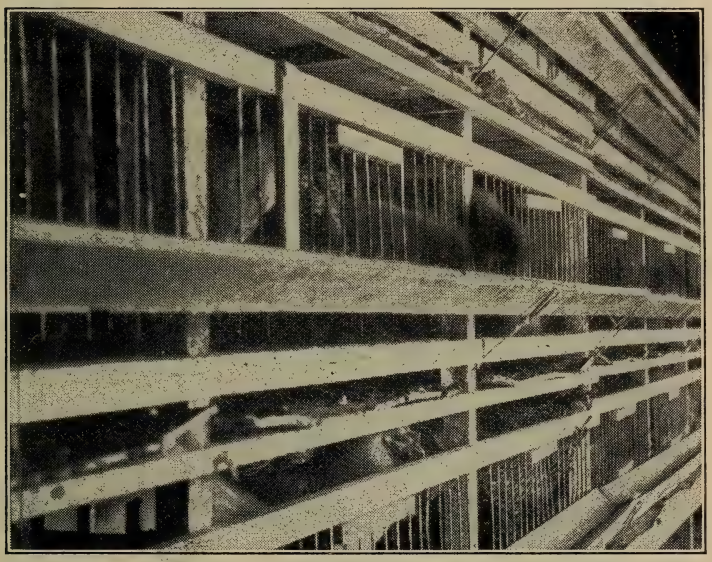
The degree of success in the work of fattening depends considerably upon the condition of the cockerels when the process begins. Specimens that have been closely confined and fed heavily do not fatten rapidly nor do those which have been on a wide range and fed but little. The bird which has been supplied with a well-balanced ration, in sufficient quantity, since the time of its chickenhood will put on flesh rapidly and well when attention is given to that work. None but thoroughly healthy birds with power of digesting well all the food given them will show the greatest gain. A well-nourished cockerel of medium size should put on from one and one-half to two pounds of weight in three weeks and present, when plucked, a well filled and rounded carcass, heavily laid with firm meat with a reasonable amount of fat.

Care of the Fattening Cockerels.

There are three methods of fattening which are successful if conditions are favorable. The fattening food may be given when the chicks have free range and fair results obtained. In most cases, however, the methods known as "pen" and "crate" fattening are preferred. In pen fattening the flock of birds is given a small pen under cover, with a yard of medium area attached, and is fed regularly each day three meals of fattening food. As soon as they have finished eating at each feeding time the feeding utensils are removed, together with any food which is not consumed. Water is kept constantly before them, and milk is provided as a drink, if plentiful, in addition to its use to mix the mash. Milk, however, will not take the place of water, which must also be furnished. Everything conducive to the comfort of the birds should be given attention. The quarters should be well ventilated and kept scrupulously clean. Absolute freedom from lice and mites is essential, for these pests not only suck the blood of the cockerels, but constantly worry them.

Crate fattening, so-called because the birds are confined in small coops, or crates, where they have no chance to ex-

ercise, has been exploited very vigorously in poultry and farm papers during the past two or three years, and, when the proper equipment is at hand and the work is done by a skilled poultryman, it is satisfactory. For general use the method is not so successful as the pen method. In a test involving the two methods made recently at the Central Experimental Farm, located at Ottawa and maintained by the Canadian Department of Agriculture, it was demonstrated that the



Fattening Crates, Where Soft-Meated Roasting Chickens are "Finished" for Market.

pen-fattened birds put on flesh more rapidly and at less expense than the crate-fattened specimens. This, too, when the work was in the hands of acknowledged experts in this particular branch of the poultry business.

The Fattening Foods.

The makeup of the fattening ration depends considerably upon the demands of the market in which cockerels are to be sold. Most markets in the United States prefer yellow

skins and yellow shanks; to produce these a greater proportion of yellow corn is needed. In markets where white flesh is demanded or preferred, a larger proportion of oats can be used in the makeup of the ration.

For the production of yellow flesh, a ration of two parts corn meal, two parts ground oats, one part wheat bran and one part beef scraps, mixed with sweet skim milk, is very effective. This may be fed twice a day, morning and noon, and the evening feed may consist of cracked corn one day and wheat the next. This ration is especially adapted to feeding birds in pens and we do not recommend it for feeding those in crates. The mash should be fed in troughs and within fifteen minutes after it is placed before the chicks, the troughs and any food that remains should be removed from the pens. Cracked corn and wheat should be fed in a deep litter of straw or leaves and no more should be given than the chicks will scratch out at each meal. It must be

"Pickers" at Work at a Crate Fattening Establishment.

Packing Specially Fattened Roasting Chickens.

remembered that this ration is very rich and the chicks will soon tire of it unless they have plenty of fresh air and some exercise, especially if any food is allowed to remain before them between meals. A ration less rich is sometimes advisable and may be made by removing the beef scraps and increasing the amount of bran, so that the ration will be two parts corn meal, two parts ground oats and two parts wheat bran, mixed with milk. Milk is very necessary in the fattening ration, as it is of considerable value as a flesh former and at the same time makes the mash much more palatable. The mash containing beef scraps will put fat and flesh on much more rapidly than the one without it.

When white meat is desired, together with a white appearance of the flesh, less corn and corn meal should be given the fattening birds. In the experiments at the Ottawa Station referred to, a ration composed of two parts ground oats and one part each of barley and corn meal, mixed with skim milk, was found very satisfactory for use with the "pen" and "crate" fattening methods. Although the

quality of the food mentioned determines to a considerable extent the success of the operation, other things must be favorable or good results will not be obtained. As we mentioned before, clean, healthful quarters and freedom from vermin are essential.

Preparing the Fattened Birds for the Market.

The high-class market demands that all birds be dry picked. The best method of killing, in our opinion, is to stun the bird with a quick blow on the head at the base of the brain, and then sever the arteries back of the roof of the mouth with a two-edged knife. The latter operation is performed by forcing the beak of the specimen open with the thumb of one hand, which in addition holds the head and neck of the bird, while with the other hand the knife is reached down the throat and a cut made directly across the throat back of the roof of the mouth. The feathers are then removed rapidly though carefully and the specimens are placed in ice water to cool, after which they are hung up to dry and then carefully packed in boxes for shipment. It is absolutely necessary that the specimens be thoroughly dried before being placed in boxes, otherwise the moisture will cause the paper in which they are wrapped, or the straw, as the case may be, to adhere to the skin of the birds, giving the entire shipment a bad appearance when it arrives in market. Only one grade of stock should be placed in each coop, and any that are not thoroughly well prepared and do not present a thoroughly attractive appearance should be sold by themselves and not shipped in the same box or crate with the better specimens. The price of the whole is likely to be governed by the inferior carcasses. In every city of any considerable size there is a class which wants, and which will pay for, very fine chickens. It will usually be found that some one, two, or three dealers have most of this trade and it is with these dealers that the producer must arrange for handling his stock. In most cases it will be necessary for the producer to see the dealer personally and show him, by actual specimens, that he can produce the quality that commands high prices. It is not often that any particular ability as a salesman is needed to dispose of this grade of stock.

KILLING AND PICKING CHICKENS.

A Brief Description of the Methods Employed on Large Poultry Farms and in the Establishments of Wholesale Dealers—The Wages of the Workers.

By Arthur C. Smith.

Picking and dressing fowls and chickens, like all branches of the poultry business is being rapidly reduced to a science, being one of the small but necessary details of the market business it has been reduced nearer to an absolute, perfect science than has any other branch of the industry.

Science has not as yet produced a substitute for the hen's egg that has interested people to any extent, neither has any invention produced a machine for picking and dressing fowls, but the way that the most adept pickers accomplish that task is certainly very machine-like.

Pickers, as a rule, do nothing else, making this work a specialty. At five cents per bird, they have been known to earn nearly forty dollars per week. This speaks volumes for the quick machine-like action of the picker.

The Process of Killing.

These pickers go about their business as if it were business and while there is no unnecessary cruelty, the dignity of the chicken is assailed to annihilation. The more merciful of the pickers begin operations by rapping the chicken's head over a smooth flat stone which stuns them and complete the killing process either by cutting an artery inside the throat, or by cutting the throat outside just back of the ear-lobe. The latter method is going out of practice because the other leaves the head and neck looking better.

The braining process is increasing in practice. Some pickers make the objection to the stunning method that if the bird is hit too hard its muscles stiffen and the feathers pull hard, while if not hit hard enough it does not accom-

plish its object. There is something in this and more in the latter than the former objection. They claim that the braining process is sure to render the bird unconscious nine times out of ten with no hindrance to the picking process. However this may be, the bird winces terribly during the braining process, before it is accomplished, a thing that there is no opportunity and no occasion for in the stunning method. If the braining process is a help to the picker, which is doubt-

The Process of the Braining, Described by A. C. Smith.

ful, it is certainly no great comfort to the victim if one can judge by appearances.

If the braining process is used, the chicken is taken from the box and held firmly under the left arm while the left hand holds the mouth open. The sharp knife (better with a double edge for a little distance from the point) is drawn rather deeply and diagonally across the roof of the mouth, coming out at the side, cutting the large arteries. The

point of the knife is then driven through the roof of the mouth to the brain. This renders the bird unconscious, the muscles relax and the feathers consequently come easily.

Plucking the Feathers.

The legs are then held firmly in the left hand until the bird ceases to struggle, which will be soon, its head is held between the knees or between the right knee and the barrel or box into which the feathers are thrown and the feathers are plucked as soon as possible after the braining.

Removing the Breast Feathers From a Tender Roaster.

The way a good picker will make the feathers fly is an illustration of what may be called "fast work." One would think that he had no thought except to get those feathers out regardless of whether the chicken held together or not. The tail feathers are grabbed all at once in the right hand and yield to a forceful snap of the picker's right arm. The back feathers are extracted in one or two handfuls more. They come in clusters and in the picker's hand look not unlike a chrysanthemum in full bloom. The shoulders and

neck are plucked scarcely more tenderly. All this is done in less time than it takes to tell it. The feathers of the fluff and thighs are literally torn out, the aim of the picker seeming to be to get as many feathers as possible in his hand at once.

Then comes a wing and there is seemingly more care used. The left hand grasps the shoulder while the right plucks all the secondaries and primaries by one sliding, slipping motion, beginning next to the body of the bird and ending with the outside primary. This is an action in which the thumb scarcely plays a part except to guide the feathers into the hand. On the wings the shoulders are most likely to tear, especially in young stock. The breast feathers are the most difficult to pull without tearing the skin and often in young stock, broilers for example, the picker must commence at the throat and remove but a few feathers at a time, plucking somewhat in the direction that the feathers grow.

The short feathers yet in the quill are pulled out by the aid of a dull knife, the picker catching these between his thumb and the blade of the knife.

The picking finished, the bird is tossed into a tank of cold water and remains there two or three hours. When cool the chicks are taken out and allowed to drain and dry. They are then straightened out and pulled into shape, the wings folded and the finished carcasses hung up.

The Earnings of Pickers.

Pickers average about eight to ten chicks an hour. An expert will do much better; an average of 150 per day is reached by the pickers employed by one wholesale firm. They can pick more if called upon to do so, but, of course, work longer hours. One picker has a record of having earned over eighty-eight dollars in one week. Twenty-eight to thirty dollars is this man's usual pay for one week's work and thirty-five dollars is not an uncommon week's wages for him. This may seem like big pay for this kind of work, but it must be remembered that picking chickens as these men do it requires an alert mind as well as active, skillful muscles.

PROFITABLE MARKET CHICKENS.

How the Work of Hatching and Rearing Four Thousand Chicks Annually is Done on a Successful Poultry Farm—A Description of the Equipment Used—How the Chicks are Fed and Cared for—Marketing the Products.

By Arthur C. Smith.

Dotted among the hills of Norwell and the adjacent country are many establishments for raising soft roasters for the Boston and New York markets. These are famous as South Shore capons. Briefly stated, the business is this: The chickens are hatched from August first to October fifteenth. The cockerels are caponized at the proper age and placed on the market when ripe. This is generally between April first and July first. This soft roaster business is one of the best propositions connected with the poultry industry, but it certainly requires a man who understands running incubators and brooders, to conduct it successfully.

This (the use of incubators and brooders) is the part of the business that we want especially to study and we shall for the time neglect the details of the soft roaster industry to study this, an incidental part of the business.

We selected the plant of Mr. Smith, located in Norwell, as the subject, and we were fortunate in our selection, for not only did we find a splendid plant for utility uses, a flock or two of splendid chickens, but we met splendid people. To talk with Mr. Smith on any topic is to talk with a thinker and you are compelled to think whether you are inclined to or not. Mr. Smith belongs to a class of poultrymen who do their work with their heads rather than with their heels. How he does it we shall endeavor to explain in this article, paying particular attention to the arrangement and management of the brooder house.

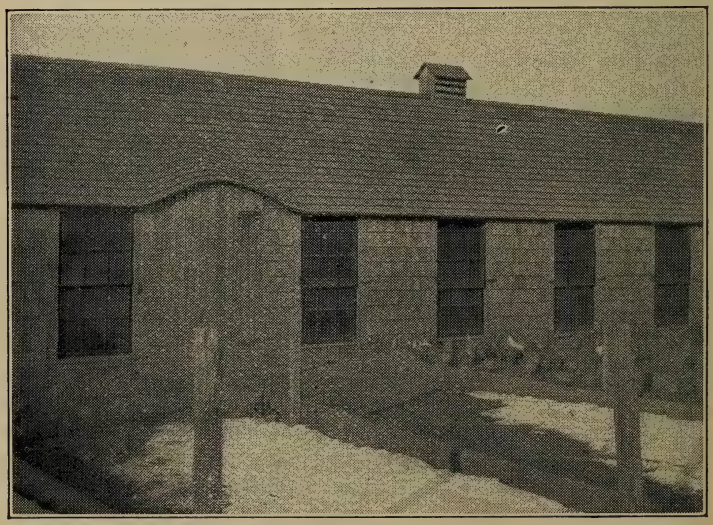
There is a reason for this. The chicks that the writer

saw in these brooder houses were the liveliest and brightest that he has ever seen together under artificial conditions. The smallest were two or three weeks old and the largest about a pound in weight. A good many of the older ones had just been disposed of for broilers at forty cents each.

The Brooder House.

To take up the study of the brooder house, Mr. Smith first built a house sixty feet long and fourteen feet wide. This was first fitted up with a hover system of brooding, but this was not to Mr. Smith's liking and it was taken out. The remodeled house has an aisle a little over two and one half feet wide at the north side, the house facing south. This house is about six feet high to the eaves and has a pitch roof. To hold the heat down where the chickens would get the benefit, a ceiling was constructed on a level with the eaves. There is a cement floor throughout but the floor level in the aisle is six to eight inches lower than in the pens.

The pens are supplied with from two to four inches of



Exterior of One of the Brooding Houses Mentioned by A. C. Smith.

Interior of One of the Brooding Houses Described by A. C. Smith.

sand according to the size of the chicks. The larger the chicks the less sand. This gives more room under the pipes. The pens in this house are six feet wide by about eleven and one-half long.

Hot Water Heating System.

The heating system is hot water with eight pipes, four flow and four return. These pipes are put up about six inches above the cement floor. The space between the sand and the pipes varies with the size of the chicks. These pipes are placed about eight inches from the aisle partition, which is about two feet high, and are about two inches apart.

Mr. Smith now uses one and one-half inch pipes, sometimes three flow and three return and sometimes four in each set, according to the amount of air space in the house being fitted. The partitions in these houses are about three feet high. The bottom is of wood and the rest wire.

Uniform Heat and Proper Ventilation Make Good Chicks.

Heating and ventilation problems, Mr. Smith says, must be correctly solved in order to raise profitable chicks. To

these problems Mr. Smith has devoted a great amount of study. He soon found that if the chicks were healthy and comfortable they would not crowd into the warm corners. He determined to have a uniformly warmed house, free from drafts but thoroughly well ventilated. He has succeeded. The writer was never in a more comfortable brooder house —warm, no drafts and a plentiful supply of fresh air. The ventilators are square boxes nearly a foot square that run up through the ceiling into the large air space above.

This large air space is ventilated in turn by other air shafts that extend through the roof. There are only a few of these to the building and the manner of construction may be seen in the accompanying photograph of the exterior of the brooder house. The ventilating shafts in the lower part of the house extend down to about one foot from the floor, and are in every alternate pen.

A Good Regulator Controls the Heat.

The uniform heat which Mr. Smith is able to maintain is due to two things. First, plenty of heating capacity in the heating system; second, to an electrical regulating device that Mr. Smith devised. The writer wishes he could properly describe it, but is not sufficiently versed in mechanical and electrical terms. Briefly, a thermostat of hard rubber and sheet steel is placed under the pipes. The expansion and contraction of this completes an electrical circuit connected with a clock-like device that opens or closes three drafts in the heater. This machine is so accurate and sensitive that the heat can be controlled within two degrees. That is, if a temperature of 90 degrees Fahrenheit is wanted, the thermostat can be set so that the temperature will never fall below 89 degrees nor rise above 91 degrees. This regulator can be adjusted so that it can run the heat at any temperature by the simple turning of a screw.

A second brooder house has been added to the first on exactly the same lines except that the pens are nine feet wide.

Other Buildings of Simple Construction.

The other buildings scarcely need description in detail. The sixty colony houses in use on this plant are nearly all

six by eight and house fifty chicks to maturity. They are set up nearly a foot from the ground and have sand bottoms. No roosts are provided, as they do well without them and have better breast bones, an important point in market poultry of the fancy sort. Each building faces the south. There are but two features that can be classed as novelties. One of these is an opening above the window about ten inches wide by two and one half feet long covered with fine netting. This is always left open except in case of a hard rain that would beat in. Then cloth covered frames are fitted in. The second is a simple hopper made by nailing two boards vertically to the wall of the building which have been cut to be two inches wide at the bottom and seven inches wide at the top. Other boards are nailed then to the edges of these; a shallow box is placed underneath and this makes a simple but good hopper.

House for Laying Hens.

This is one of the regulation affairs seen for twenty or thirty years. It has been adjusted to modern ideas by making roosting rooms and open sheds in pairs by boarding up the partition at the end of the first and every second pen. The roosts and windows of the second, third, fifth and sixth pens and so on have been removed and these changes make these pens scratching pens.

Eggs Purchased from Farmers.

Mr. Smith has to buy most of his hatching eggs. These are gathered from farmers at fifty cents a dozen. This has taken nearly two days of Mr. Smith's time every three weeks, but the automoblie has proven successful here, and he now covers the same ground in less than a day. Unlike most of the South Shore plants, this one does not restrict its business to soft roasters, but from August to October no variety of chicks is hatched but Light Brahmas. These are marketed when ripe. The pullets are grown in their natural state but all cockerels are caponized. Pullards have proven a failure so far as increasing the weight is concerned and the South Shore raisers have discarded this product because it does not bring in more money. Caponizing pays and therefore the practice is adhered to.

The South Shore Light Brahmas are small compared with

the Standard Brahma. They are about the size of a Plymouth Rock, but retain the Brahma characteristics. They are slow growers and therefore keep soft longer than other varieties. They may therefore be hatched in August and September, in time to get a good start before real cold weather sets in, and still be soft and tender in June when the best prices are paid.

After October fifteenth Mr. Smith hatches Barred or White Plymouth Rocks exclusively. The cockerels are caponized at a proper age, but the pullets are sold as broilers, sometimes at a pound weight if the price is large, but when the prevailing price is not forty to fifty cents a pound, they are kept to the large broiler age and sold when they weigh two and a quarter pounds. They then bring about thirty cents per pound. The cockerels are sold at the same time that the Light Brahma cockerels are, and also as capons.

The Light Brahma pullets are ready for market in March or April and are sold then as they must be marketed before they are laying to obtain a good price.

The Feeding System.

The chicks are kept in the incubators until the twenty-third day and then removed to the brooder house. Here the temperature is kept to nearly 90 degrees for a time, but is gradually reduced until the chicks are ready to be removed to the colony houses. This reduction of temperature can be accomplished by adjusting the regulator if the chicks are all of an age, or by taking the sand out from under the hot water pipes if the age of the chicks in different pens varies much. The smaller chicks are fed some good mixed chick feed five times a day. Every morning a supply of ground scraps and cut clover rowen is given, sufficient for the entire day. The supply of rowen is intended to exceed the demand so as to furnish a little scratching litter. Cabbages are suspended from the ceiling just high enough to make the chicks jump a little to reach them. A little later finely cracked corn, hulled oats and cracked wheat is substituted for the more complicated mixed chick feed. Water is a constant running supply in each pen, furnished from a pipe laid through the center of the house. The chicks drink

from a small trough hung on the partition. This may be removed and cleaned at will.

Colony Houses for Young Chicks.

At the age of eight to ten weeks, according to conditions, the chicks are removed to the colony houses. Fifty are put into each house. There are sixty of these houses in two groups, twenty-three in one group and the remainder in the other. The chicks are fed by the hopper method, though that is varied somewhat. The poultryman makes the round with a horse and truck in the morning with his barrel of water and a supply of grit and scraps. On certain days the hoppers are filled up with grain. When first put in these houses the chicks are fed a mixed feed consisting of cracked corn, wheat, oats and barley. After they acquire five pounds or more of weight they are fed cracked corn and scraps only. The scraps are supplied every day, but the corn is fed in hoppers.

This method enables a man to look after a great many birds and if successful it is proof that poultry does not need to be coddled or kept in germ-proof ovens.

Good Prices Obtained.

From May twentieth to July first the best prices are paid for these capons. It does not always pay to hold them for the top prices as there is a time when they go back, or fall off in weight, and what is gained in price is lost in weight. The Light Brahma pullets are usually sold in March or April. Thirty cents a pound live weight is often received for capons and they have been sold at thirty-three cents on the South Shore. These capons usually weigh eight pounds each and ten is not uncommon. The largest bird that Mr. Smith ever sold brought him $4.28. Any fancier has very fair specimens that he would gladly dispose of at that figure, after he has spent considerable money advertising them.

A Group of Colony Houses Used in Producing Prime Soft Roasters.

THE SOFT ROASTER INDUSTRY.

A Business that is Profitable Whether Conducted Exclusively or as a Side Line—How Soft Roasters are Produced and Marketed—$200,000 Worth Sold from One Town —Eggs for Incubation are Purchased and Hatching Begins in August—How the Chicks are Housed, Brooded, Fed and Sold.

By Arthur C. Smith.

One of the safest, surest and most satisfactory branches of the poultry business considered as a means of securing a livelihood is the Soft Roaster Industry as practiced by the Massachusetts South Shore poultrymen.

This class of roasters is raised largely in Norwell, Rockland and Hanover on the South Shore of Massachusetts Bay. But it is not a business that is exclusive to these towns. There is one large raiser in Plymouth, Mass., another in Hingham, Mass., and to the North of Boston, one in Methuen.

There are several persons who give their time exclusively to raising this product, but there are many more who do it in a good sized back yard or in a small country-town lot as a side issue. The former class raise them by the thousands, one party raising six thousand this year, while the latter raise from a half a hundred to five hundred. This class comprises carpenters, shoemakers, clerks in stores and about all classes of people.

Other Parties Market Them.

Whoever raises them they are sure to go into the Boston market through one of two firms. They are collected either by Mr. Curtis or Mr. Farrer, killed, dressed, and shipped by them. Mr. J. H. Curtis handles the most chickens, but does not attempt the kindred industry of handling eggs in which Mr. Farrer is also engaged. J. H. Curtis undoubtedly

ships more first class market chickens into the Boston market than any two other firms. He ships regularly 300 chickens a day in season and can triple this output at very short notice. Six hundred to fifteen hundred chickens in prime order are held in stock on this place, ready to supply any hurry-up telephone orders.

The size of this industry may be calculated when it is known that between one and two hundred thousand dollars are paid for this product from this locality in a single season, at wholesale prices.

The price per pound to the raiser varies from twenty-five to thirty-three cents, live weight, for the choice product of soft roasters at the best season, which begins in April and ends about July first. The last of May to the middle of June brings the best prices. Live poultry at these prices enables the buyer to count money very fast.

One Man's Income is $5,000.

One man, a carpenter, besides working every day at his trade, raised in one year seven hundred chicks for which he received eleven hundred dollars. The next year he raised eleven hundred chicks for which he received seventeen hundred dollars. Later he gave all his time to rearing these fancy roasters. Last season Mr. Curtis took from this man's place in one and one half days six hundred thirty-eight dollars worth of this product. During the year this plant produced chickens enough to bring between four and five thousand dollars and has been producing approximately this amount in chickens for the past three years.

There is not an adult hen or fowl on this place. The hatching eggs are purchased in the neighborhood. Hatching begins last of August and the chicks are all in the market before the first of July. This arrangement allows from one to two months to fit up for another season's business.

Another plant has annually produced about five thousand of these soft roasters and the owner says that the first three thousand will pay the bills. This means that the last two thousand will give him the net profit. This makes it appear that more than two-fifths of the total income is profit as the last two thousand are sold at the best prices usually.

The greater number of those engaged in this pursuit keep

One of the Collecting Outfits of J. H. Curtis Returning From a Trip to a Soft Roaster Plant.

no hens at all, buying the eggs where the stock seems vigorous, selecting everything produced before July first.

In this business the main thing is to make the chickens live and grow. These men are now very careful in selecting their eggs. They have learned that the health and vigor of the parent stock is the greatest requisite to a good and thrifty flock of chickens. Some are keeping their own parent stock for this reason.

The Varieties Used

Are Light Brahmas, Barred and White Plymouth Rocks. The latter are rather taking the place of the Light Brahmas. Light Brahmas keep soft longer, thus enabling the raiser to put them on the market as prime soft roasters at nine months of age, a fact that will always assure them a place in this

industry. At this age a Plymouth Rock would bring only the price of an old fowl. Then, again, chicks started in August and September do a great deal better than those started in winter. The percentage of loss is less both in eggs and chicks at this time than later, but, as before stated, Plymouth Rocks hatched in August or September get hard before prices are high.

Light Brahmas for Early Hatching.

Light Brahma eggs are therefore always used for the August and September hatches. Even until the middle of October this variety is hatched. After that Barred or White Plymouth Rocks are hatched and those that are hatched in December and January weigh as much in June as the Light Brahmas that are a couple of months older. The point is that a larger percentage of the early chicks are raised than of the winter chicks.

These raisers all testify that the fertility of Brahma eggs is very low after October first. They agree that the vitality of a Brahma chick is much lower than the vitality of a Plymouth Rock in winter. So it seems that the Light

The Nursery Brooder House on a Soft Roaster Establishment.

Type of Colony Houses Used in the Rearing of Soft Roasters.

Brahmas are especially fitted for early hatching and the Plymouth Rocks for the later hatching.

Different Systems of Brooding Used.

To be successful in an undertaking of this kind, one must be an expert with incubators and brooders, especially the latter. The brooder has been the object of special study by these men, yet they differ much in their opinion of the best method. Henry D. Smith, a Massachusetts poultryman, has discarded hovers, uses the open piping and heats the whole house. He pays no attention to the temperature of the house in general, but the effect is that the whole house is heated.

Some use individual brooders until the chicks are from three to four weeks old and then put them in a pipe system brooder house. Others use the regular brooder house with hovers for three to five weeks and then transfer to colony

houses about six by eight feet on the ground and which contain outdoor brooders of some well-known make. One raiser uses outdoor brooders of his own make for the September chicks and a hover system brooder house afterwards.

The writer has seen good chickens raised with all these systems, but believes that those raised under hot water pipes with no hovers, but with the heat automatically regulated were the best.

Chick feed mixtures of well-known makes are almost always used for the youngest chicks. They also have beef scraps, chick grit and charcoal and are also fed cut clover and several kinds of green food. Some breeders a little later substitute small cracked grains, such as cracked wheat, corn and hulled oats for the chick feed.

The Colony System.

This is used universally after the chicks leave the brooder at an age of two to three months. The houses are about six by eight feet and house fifty chicks each. All the male chicks are caponized and held until high prices prevail. The pullets are sorted out and sold before they lay.

In these houses the birds are fed principally cracked corn and beef scraps, though they are given a liberal supply of grit, oyster shells and charcoal. They are fed, mostly, by the hopper system. These houses are supplied with a door and a window. Above the window is a ventilating space that is never closed except in case a storm is beating in upon the chicks.

The amount of money expended annually for these prime roasters in Boston and vicinity indicates that many people are making a fair income from this source. The fact that from one to two hundred thousand dollars go into the hands of a few people in the vicinity of Norwell each year is proof that they are making a good living from this industry, particularly when it is known that the same people are raising soft roasters year after year.

To visit these people and see their comfortable homes filled with happy and contented families is to convince oneself that this branch of the poultry business yields a substantial income.

It would appear from the facts and figures presented that

the soft-roaster industry pays large profits. It is hard for one who is unacquainted with the details to understand how chickens raised at an unnatural time, with all the extra expense incident to such raising, can pay as well as do chickens raised at a natural time and with comparatively little expense and effort.

There are two answers to this question. The first is that the expense is not so much greater as might be supposed; the second is that these chickens bring a price that no other chickens of mature size in the world can command.

A prominent market man of Boston who handles as much fine poultry as any competitor, if not more, in a recent conversation, said that no chicken compared with a South Shore roaster in quality.

The Retail Price.

These roasters bring, in the height of the season, at retail, thirty to thirty-eight cents a pound. The limit seems to be about thirty-eight cents. As soon as the retail market men demand more, people shift to broilers and green ducks. Soft roasters bring the highest prices about the middle of June, but they are high from the first of April to the last of June. After that they are superseded by the broilers. There is but one form of chicken on the market that brings a larger price per pound than the soft roaster and that is the early broiler. These occasionally sell for fifty cents per pound and weigh three fourths of a pound to two pounds each. They do not pay as well as the roasters at that because the producer and the seller reap a profit on two pounds instead of seven to ten pounds, the usual range of weight in a soft roaster.

These are the retail prices and not the prices that the producers get. As a rule the raisers get six to eight cents a pound less than the retail price. The difference is divided between the jobber as he may be called, that is that man who collects, kills and ships to the dealers and the retailer. In some cases the wholesaler has to be counted in, for while some of these chickens go direct from the jobber to the dealer, a great many are handled by wholesalers.

South Shore roasters in December and January bring about twenty-two cents per pound at wholesale. The price

gradually increases until thirty-five cents to thirty-eight cents is reached about the middle of June, when it gradually drops again to about twenty cents in October and November.

The Division of Labor.

The division between the different branches of this industry is very noticeable and is a factor in its success. The man who raises South Shore roasters as a business contents himself in a great majority of cases with that branch of the business solely. In many instances he does not even attempt

A Consignment of Soft Roasters Delivered to the Killing Establishment.

to produce his own eggs and less often does he market his product.

The eggs are generally produced by small keepers who have hens as a side interest. Some of the flocks from which the eggs come are kept on farms, but many inhabit the rear of a large town lot. Probably more than ninety per cent of all the eggs from which these prime roasters are hatched come from flocks not owned by those who raise the chickens.

The jobbers are supreme in this South Shore enterprise and the two firms mentioned have control of every fine roaster on the South Shore. Although some of the growers ship direct to the wholesale and retail dealers, they do so

on the accounts of these jobbers. One grower became a trifle dissatisfied because it was apparent to him that he was not getting every dollar made on his chickens, and finally told the jobber with whom he dealt that he wanted every dollar that was to be had and that he was going to ship direct, on his own account thereafter. The jobber had had similar experiences and readily consented. The result was

Packing Soft Roasters for the Fancy Trade.

that he had this grower's goods the following season and was informed that the grower had not done as well as when he had allowed this middleman his share of the profit.

Wealthy People Pay High Prices.

People who will pay thirty-eight cents a pound for chicken are not running ordinary boarding houses or restaurants. It may surprise you to learn that not even the best hotels of our large cities and summer resorts use these birds when they are sold at the highest prices. This product is consumed exclusively by the wealthy trade. Such trade, however,

exists in every large city and when these people discover an exceptionally palatable dish, the price must be exorbitant to prohibit it.

This prime South Shore product is sold in Providence and Newport as well as in Boston and they have begun to call for it in New York.

There are many chicken raisers along the South Shore who have no facilities for raising these winter chicks. These people raise roasting chicks in the natural season. The prices for these do not compare of course with the prices obtained for the off-season birds. Still those who raise them keep at it, which indicates that there must be profit in the business.

Pullets are Marketed Before They Lay.

It must be remembered that the pullets are sold before they begin to lay, for after that they would bring only the prices of fowls. Consequently these pullets are marketed just before they commence to lay, no matter at what season of the year. Many are sold in January and February. These are the ones hatched late in the summer and early in the fall. Pullets form the greatest supply at what is called the "mid-season."

The features of this business and some of the causes of success may be said to be the high prices paid for a first class roaster during the month of April, May and June; the ability of these people to raise these chicks in small, cheap houses and by a system of feeding that does not require an undue amount of labor; the fact that the staple food, cracked corn, is usually the cheapest grain in our market.

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